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Unbounding Rationality: Observing and Mitigating K-12 Public Education Administrators' Cognitive Bias

Julie K. Mesaros
jm572052@wcupa.edu

Unbounding Rationality:

Observing and Mitigating K-12 Public Education Administrators' Cognitive Bias

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Julie K. Mesaros

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Dedication

I dedicate this dissertation foremost to my parents. Their lives, careers, value of education, and, most of all, love have motivated me to enter public service and pursue public scholarship for the betterment of our world.

This dissertation is also dedicated to the late Dr. Dorothy Hurley, who was an inspiring, fiercely intellectual professor in my master's program. She widened my eyes to the importance of social equity and multicultural education. Dr. Hurley was the first professor to encourage me to apply for a doctoral program. Her generosity of spirit remains with me.

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Abstract

Humans tend to simplify complex decisions by employing cognitive bias(es). Cognitively biased decision-making by public administrators can be adversely consequential for public organizations, public employees, and the public interest. Given the historical scope of experimental research on cognitive bias in the social and physical sciences, public administration scholars should continue to advance such research across various public sectors. This dissertation study responded to the long-ago call of Herbert Simon for empirical research situated in specific public or political contexts. This qual-QUAN mixed-method study had two main aims: (1) explore decisions that K-12 public education administrators make in personnel management and organizational policymaking; and (2) observe and mitigate the influences of anchoring bias and attribute framing bias in decision-making by these administrators. Qualitative results indicate that school district superintendents and school principals make decisions in highly collaborative contexts. This data informed the quantitative survey-in-the-field. Quantitative results indicate that anchoring bias significantly influences personnel management decisions, and that attribute framing bias significantly influences organizational policy decisions. Also, the consider-the-opposite (COS) intervention significantly mitigated anchoring bias and attribute framing bias about 67% of the time. Finally, for three of six anchoring bias scenarios, participant age and COS feedback quality significantly predicted COS interventional influence. And, for four of six attribute framing bias scenarios, COS feedback quality significantly predicted COS interventional influence. Recommendations for research and practice are advanced, including debiasing procedures implemented on the organizational level.

Keywords: decision-making, cognitive bias, anchoring bias, attribute framing bias, debiasing, K-12 public education, personnel management, organizational policymaking, behavioral public administration.

Table of Contents

List of Tables

Chapter I: Introduction

Herbert Simon (1946, 1947) called for experimental research in the public administration field more than 75 years ago. Until that time, classical organizational theorists had espoused theories of behavior untested in the field, particularly related to decision-making. Simon's (1946, 1947, 1955) theory of bounded rationality challenged the classical notion that political actors behave according to prescriptive or normative decision-making models. He refuted explanations like expected utility theory, which asserts that decisions are or should be based on reason and comprehensive analysis. Simon's (1947, 1955) pivotal theory of bounded rationality sparked a paradigm shift to neoclassical organizational thought. According to his original theory, decision-making is bounded by limits to rationality, such as incomplete information; inaccurate computational ability; unconscious mental habits; and personal values and biases (Simon, 1946, 1947, 1955).

The theory of bounded rationality was soon extended to theories about cognitive bias, which have been described experimentally in the social and physical sciences, yet only recently by behavioral public administration researchers (Battaglio, Belardinelli, Bellé, & Cantarelli, 2018). As demonstrated empirically across a wide scope of domains and sectors, public administrators are not immune to errors in decision-making caused by heuristics, or mental shortcuts, which are mediated by cognitive bias(es). Cognitively biased decision-making by public administrators can be adversely consequential for the public organizations, public employees, and the public interest. This dissertation research, therefore, was undertaken to study the influence of cognitive bias on decision-making, namely to elucidate decision-making behavior of administrators in K-12 public education, one of myriad public sectors in which behavioral public administration research could be conducted.

Specifically, this dissertation research study entailed a mixed-method, qualitative-quantitative design. The first-stage qualitative study aimed to explore and discover the types of decisions that K-12 public administrators make in domains of personnel management and organizational policymaking. Extended from the qualitative data analysis, the second-stage quantitative study aimed to observe and mitigate the influences of two cognitive biases—anchoring bias and attribute framing bias—in decision-making by K-12 public education administrators. The first-stage qualitative study purposively sampled former K-12 public education administrators, whose qualitative interview feedback informed the second-stage quantitative study, which quasi-experimentally sampled currently practicing K-12 public education administrators. Both studies' participants had practiced or currently practice in Pennsylvania, except for one former administrator who had practiced in New Jersey.

This dissertation research study served to answer the long-ago call from Herbert Simon discussed above, and the recent call from public administration researchers to test the empirical generalizability of theories related to cognitive bias and debiasing. This study's research design, data findings, and implications will hopefully enrich the behavioral public administration theory base as a field of study in its own right. This *Introduction* chapter provides an overview of the problem; cognitive bias in the public administration literature; cognitive bias constructs; study rationale; research questions and hypotheses; key study terms; and design delimitations and limitations.

Problem Statement

Humans make decisions of all kinds, from minor everyday choices to major life-altering decisions. However, we often fail to address ourselves to complex decisions, instead filtering information through cognitive biases that reduce complexity, yet result in systematic errors in

judgment (Anderson & Hjortskov, 2016; Evans & Stanovich, 2013; Kahneman, 2000, 2003, 2011; Kahneman, Sibony, & Sunstein, 2021; Kahneman & Tversky, 1979; Tversky & Kahneman, 1981, 1990). A systematic error in judgment, simply put, results from a decision that predictably falls short of a rational decision (Thaler, 1980). In terms of evolutionary adaptation, cognitive biases minimize costs of time and energy in decision-making, allowing humans to make immediate decisions for survival, although such decisions can have maladaptive consequences (Arkes, 1991; Stanovich as cited in Crosskery, Singhal, & Mamede, 2013a); Weinstein, 2003; Wilson & Brekke, 1994). For instance, due to systematic errors in judgment, humans make unfounded predictions; default to readily available but incomplete information; place inequitable weight on competing options; and interpret data positively or negatively depending on how it is framed (Davidow & Levinson, 1993; Huber, Payne, & Puto, 1981; Kahneman, 2003, 2011; Sunstein & Thaler, 2003; Tversky & Kahneman, 1981, 1990; Weinstein, 2003).

The following are brief examples of how these systematic errors in judgment are caused by cognitive bias in the real world. First, unfounded predictions due to availability bias may lead us to overestimate our future financial security when basing this estimate on our current financial status, and therefore fail to save adequately for retirement (Congdon, Kling, & Mullainathan, 2011). Second, anchoring bias may cause someone to estimate a quantity based on an arbitrary number, such as the last four digits of a social security number, when asked to cite these last four digits and then estimate a quantity (Kahneman, 2011). Third, placing inequitable weight on competing purchase options due to asymmetric dominance bias may cause us to neglect a cheaper, but still adequate, option when this cheaper option is monetarily adjacent to a more expensive option that is only slightly more expensive (Huber et al., 1981) (e.g., Option A = $50;

Option B = $67; Option C = $70). Lastly, when someone is presented with data that is positively or negatively framed, attribute framing bias may lead the person to perceive logically equivalent data differently according to its valence framing (Tversky & Kahneman, 1990). For example, [Negative framing] 30% of Americans *disapprove* of the President's performance = [Positive framing] 70% of Americans *approve* of the President's performance).

Overview of the Literature

Cognitive Bias in Public Administration

Public administrators are not immune to these common, but maladaptive, systematic errors in judgment. As such, cognitively biased decision-making in domains like personnel management and organizational policymaking can be adversely consequential for public employees, public organizations, and the public interest, given that public or political decisions are frequently made amid an overwhelming amount of competing information, and are demanded under time and external pressures (Bardach & Patashnik, 2020; Battaglio, Belardinelli, Bellé, & Cantarelli, 2018; Belardinelli, Bellé, Sicilia, & Steccolini, 2018; Bellé, Cantarelli, & Belardinelli, 2018; Birkland, 2020; Dudley & Xie, 2019; Stone, 2012; Weimer & Vining, 2017). When it comes to public policymaking, policymakers must sift through large amounts of information and then select among policy alternatives across varying, often contradictory, outcome criteria based on cost-benefit, cost-effectiveness, or other policy analytic frameworks (Bardach & Patashnik, 2020; Birkland, 2020; Stone, 2012; Weimer & Vining, 2017).

The following are public administration examples of the two cognitive biases observed in this study—anchoring bias and attribute framing bias—in decision domains of personnel management and organizational policymaking. To illustrate anchoring bias in public personnel

management, if a manager considers an employee's current year performance evaluation by comparing it to the employee's prior year performance evaluation, which anchors her or his evaluation in the current year, the manager could overestimate or underestimate the employee's actual performance in the current year. Consider how quantitative measurements on a rating scale could anchor the manager's perception of the employee's performance, either too high or too low, when last year's evaluation is used as a baseline for this year's evaluation. To illustrate attribute framing bias in organizational policymaking, if a policy analyst frames a cost-benefit outcome positively, this would communicate a more appealing tone than would an outcome framed negatively, even though the data itself is logically equivalent. Consider the difference between: [Positive framing] 85% of employees stand to benefit from policy X vs. [Negative framing] 15% of employees stand to suffer from policy X.

Such influences of cognitive bias are ubiquitous in all decision domains and sectors. Yet in the public sector, decision-making is consequential to the lives of many and for years to come. Notwithstanding the breadth of behavioral science research application in practical, solution-minded ways—such as the experimental study of cognitive bias and debiasing in decision-making (Adame, 2015; Heath, Larrick, & Klayman, 1998; Hirt & Markman, 1995; Lilienfeld, Ammirati, & Landfield, 2009; Lord, Lepper, and Preston, 1994; Weinstein, 2003)—behavioral public administration researchers have only recently begun to explore the potential of this research area to improve public-sector decision-making (Battaglio et al., 2018; Belardinelli et al., 2018; Bellé, Cantarelli, & Belardinelli, 2017; Bellé, Cantarelli, & Belardinelli, 2018; Cantarelli, Bellé, & Belardinelli, 2020; Dudley & Xie, 2019; Grimmelikhuijsen, Jilke, Olsen, & Tummers, 2016). Fair, responsible, and well-reasoned public administrator decision-making may partly depend on further experimental research on cognitive bias and debiasing influences on decision-

making. Discussed in the *Literature Review* chapter are multiple theoretical frameworks for explaining cognitive bias and debiasing in decision-making in the behavioral public administration context.

Cognitive Bias Constructs

Social science researchers across multiple disciplines have long studied the influence of cognitive bias, which makes humans susceptible to systematic errors in judgment and decision-making (Bellé, Cantarelli, & Belardinelli, 2018; Cantarelli et al., 2020; Heath et al., 1998; Kahneman & Tversky, 1979; Tversky & Kahneman, 1973). In the literature on cognitive bias, a core explanatory framework is dual process theory. The theory informs an understanding of how humans process information and make decisions—differentiating between dual processes: *System 1* and *System 2*—and of how cognitive biases can hinder rational decision-making (Evans & Stanovich, 2013; Kahneman, 2003, 2011).

According to the theory, cognitive bias results from systematic errors, which are misjudgments that occur when heuristics, or mental shortcuts, prompt *System 1* cognitive processing, thereby resulting in intuitive, immediate, and self-protective responses, as *System 1* processing taps the brain's primitive cognitive mechanisms (Evans & Stanovich, 2013; Kahneman, 2003). In practice, a systematic error is a predictable deviation from rational decision-making (Bellé, Cantarelli, & Belardinelli, 2018; Thaler, 1980; Thaler & Sunstein, as cited in Bellé, Cantarelli, & Belardinelli, 2018). By contrast, *System 2* cognitive processing employs deliberation, logic, and reflection; and it has been hypothesized as a mechanism to enable humans to overcome cognitive bias (Evans & Stanovich, 2013; Kahneman, 2003). In the real world, intuition is a valuable human quality (Kahneman & Klein, 2009). However, researchers should discover how to aid decision-makers to employ logical deliberation (e.g.,

System 2 processing) to overcome intuitive mental shortcuts (e.g., *System 1* processing), especially when decisions are consequential to public employees, public organizations, and the public interest (Bellé, Cantarelli, & Belardinelli, 2018; Lilienfeld et al., 2009).

Research Study Rationale

According to behavioral public administration theory, integrating behavioral science and public administration on the individual level of analysis has pragmatic value for the field (Grimmelikhuijsen et al., 2016). Looking to the early behaviorists in our discipline, Simon (1946; 1956) called for melding behavioral science with public administration practice, urging scholars to use positivist research methods, but to also recognize the individual variability in thinking and behavior, and to view decision-making as *satisficing* (i.e., making a *good enough* decision) given persistent constraints on time and information (Battaglio et al., 2018; Grimmelikhuijsen et al., 2016; Iwasa & de Almeida, 2021; Simon as cited in Riccucci, 2010; Riccucci, 2010; Todd & Gigerenzer, 2003). Simon's concept of bounded rationality is relevant to the political domain, in which decision-making depends on pluralism, power relations, and value-based motivation, in addition to cognitive factors (Forrester, 1984; Simon, 1985). Furthermore, to understand how political actors reason and behave, researchers should explore a political context according to the subjective experiences of its actors, rather than generalize about behavior in all contexts (Simon, 1985; Simon as cited in Riccucci, 2010).

Nevertheless, researchers have only recently brought a behavioral science lens to the forefront of public administration, long after Simon's call to integrate behavioral science into the formal study of public administration, namely through his theory of bounded rationality (Simon, 1946, 1947, 1955; Simon as cited in Grimmelikhuijsen et al., 2016). Of note, Bellé et al. (2018) have specifically applied behavioral public human resource theory as a middle-range theory that

bridges abstract constructs and concrete empiricism in studies of decision-making in public personnel management. Such experimental studies are relatively new in the public administration field (Grimmelikhuijsen et al., 2016), notwithstanding that public-sector decision-making has serious consequences for public employees, public organizations, and the public interest (Bellé, Cantarelli, & Belardinelli, 2018).

Therefore, replication and extension of prior cognitive bias experimental studies are important for understanding and potentially mitigating systematic errors in decision-making in the public administration context. In general, experimental studies on cognitive bias in public administration have focused more on decisions of citizens (e.g., as political or economic actors) than that of public administrators (Battaglio et al., 2018). Studies that have investigated how cognitive biases hinder decisions made by public administrators such as judges, regulators, and public personnel managers set the stage for study replication. Furthermore, behavioral public administration researchers have called for extensions of descriptive studies on cognitive bias in decision-making, and of experimental studies on debiasing interventions intended to mitigate cognitive bias in decision-making (Anderson & Hjortskov, 2016; Battaglio et al., 2018; Bellé, et al., 2018; Cantarelli et al., 2020; Dudley & Xie, 2019; Nagtegaal, Tummers, Noordegraaf, & Bekkers, 2020).

This study capitalized on the above-mentioned opportunity gap in the behavioral public administration literature. Relatively few experimental studies have targeted decision scenarios to study public administrator decision-making in a specific public sector. Some of these experimental studies have involved survey questions that were not relevant to all study participants' real-world decision domains. This mismatch occurred in studies that targeted a sample of public administrators from varying sectors (Belardinelli et al., 2018), or a sample of

both public administrators and non-administrators in the same setting (Cantarelli et al., 2020); and that employed a survey prompting decisions made in a variety of public sectors (Bellé, Cantarelli, & Belardinelli, 2017). Moreover, despite the call from behavioral public administration researchers for survey-in-the-field experiments, there is a dearth of such experimental research that bridges cognitive bias theory to real-world contexts (Battaglio et al., 2018; Cantarelli et al., 2020). Importantly, vis-à-vis the literature gap, in the K-12 public education sector, experimental research on cognitive bias in administrator decision-making has been sparse with five known published studies, none of which has evaluated any debiasing intervention (Battaglio et al., 2018). These five studies are detailed in the *Literature Review.*

Research Design

A mixed-method research design was used, where only sampling of former and current school district superintendents and school principals in a localized K-12 public education sector: Pennsylvania. The first-stage qualitative study aimed to elicit open-ended written text feedback about the types of decisions that former K-12 public education administrators made in decision domains of personnel management and organizational policymaking. The qualitative data were analyzed and utilized to formulate germane, practically contextualized survey-in-the-field content for the quantitative study that followed. The second-stage quantitative study entailed six stand-alone decision scenarios in the survey-in-the-field data collection instrument, which elicited decision-making responses from current K-12 public education administrators in personnel management and organizational policymaking decision domains.

In the second-stage quantitative study, measurement of control group participants' responses served to observe the influence of two cognitive biases: anchoring bias and attribute framing bias. By contrast, measurement of intervention group participants' responses served to

observe and evaluate the effectiveness of a consider-the-opposite debiasing intervention in mitigating these cognitive biases. The quantitative study was, hence, the main thrust of the research design, which was exploratory and interventional. The quantitative research design partially replicated the content and data measurements of prior experimental research that observed and/or aimed to mitigate the influences of anchoring bias and attribute framing bias on decision-making.

Research Questions and Hypotheses

The following section delineates the research questions for the first-stage qualitative study, and the research questions and hypotheses for the second-stage quantitative study. In the *Data and Methods* chapter, these research questions and hypotheses are discussed in relation to the respective qualitative and quantitative studies vis-à-vis the research designs, phenomenon and variable operationalization, and data analyses.

In the first-stage qualitative study, the research questions focused on the phenomenon of decision-making. Specifically, the qualitative interview questionnaire elicited types and examples of decision-making that former K-12 public education administrators undertook for their job duties, namely in decision domains of personnel management and organizational policymaking.

In the second-stage quantitative study, the research questions and hypotheses centered on three aspects of cognitive bias: (1) the influences of attribute framing bias and anchoring bias on decision-making, as observed in the control groups; (2) the mitigation effectiveness of a consider-the-opposite debiasing intervention, as observed in the intervention groups; and (3) the quality of consider-the-opposite feedback and its relationship to debiasing mitigation, as observed in the intervention groups. In addition, the quantitative data collection instrument was

designed to collect data on potentially confounding variables related to study participant characteristics—age, education level, years in current position, total years in K-12 public education administration position(s), and school district size. These variables were to be included as covariates in the quantitative data analysis if any were found to be statistically significantly different between the four participant groups in a bivariate analysis of variance.

Qualitative Study Research Questions and Sub-Questions

The following outline delineates the research questions and sub-questions for the first-stage qualitative study. The qualitative interview questionnaire comprised the research sub-questions, which elicited from study participants open-ended text data that was analyzed qualitatively and then employed to inform the content of the survey-in-the-field instrument used to collect data in the quantitative study that followed. Below, RQ1 and RQ2 were the overarching research questions, under which the research sub-questions are listed.

RQ1: What types of decisions do K-12 public education administrators make in the domain of **personnel management?**

RQ1a: In the domain of personnel management, what specific types of decisions do K-12 public education administrators make about people in **hiring?**

RQ1b: In the domain of personnel management, what specific types of decisions do K-12 public education administrators make about people in **evaluations?**

RQ1c: In the domain of personnel management, what specific types of decisions do K-12 public education administrators make about people in **disciplinary action?**

RQ1d: In the domain of personnel management, what specific types of decisions do K-12 public education administrators make **apart from those mentioned above?**

RQ2: What types of decisions do K-12 public education administrators make in the domain of

organizational policymaking?

RQ2a: In the domain of organizational policymaking, what specific types of decisions do K-12 public education administrators make about **personnel policies**?

RQ2b: In the domain of organizational policymaking, what specific types of decisions do public education administrators make about **student policies**?

RQ2c: In the domain of organizational policymaking, what specific types of decisions do K-12 public education administrators make about **curricular policies?**

RQ2d: In the domain of organizational policymaking, what specific types of decisions do K-12 public education administrators make about **budgeting (de facto policymaking)?**

RQ2e: In the domain of organizational policymaking, what specific types of decisions do K-12 public education administrators make **apart from those mentioned above?**

Quantitative Study Research Questions and Hypotheses

The following outline delineates the research questions and sub-questions for the second-stage quantitative study. The quantitative data collection instrument contained six total decision scenarios, comprising three anchoring bias decision scenarios and three attribute framing decision scenarios. Each anchoring bias decision scenario was addressed by research hypotheses H1, H2a, H2b, H3a, and H3b. Each attribute framing bias decision scenario was addressed by research hypotheses H4, H5a, H5b, H6a, and H6b.

Research Question 1 and Hypothesis 1

RQ1: Does anchoring bias influence the decision-making of K-12 public education administrators in personnel management and organizational policymaking?

H1: The high anchoring bias control group will indicate a significantly higher mean response to each anchoring bias decision scenario than will the low anchoring bias

control group.

Research Question 2 and Hypotheses 2a and 2b

RQ2: Does a consider-the-opposite debiasing intervention mitigate the influence of anchoring bias in decision-making of K-12 public education administrators in personnel management and organizational policymaking?

H2a: The high anchoring bias control group will indicate a significantly higher mean response to each anchoring bias decision scenario than will the high anchoring bias intervention group.

H2b: The low anchoring bias control group will indicate a significantly lower mean response to each anchoring bias decision scenario than will the low anchoring bias intervention group.

Research Question 3 and Hypotheses 3a and 3b

RQ3: Does the quality of consider-the-opposite feedback influence the effectiveness of the consider-the-opposite debiasing intervention in mitigating the influence of anchoring bias?

H3a: Consider-the-opposite feedback quality will significantly influence the debiasing mitigation of high anchoring bias influence. There will be an inverse linear relationship between the intervention group's total feedback quality rating and responses to high anchoring bias decision scenarios. (i.e., the higher the feedback quality, the lower the responses.)

H3b: Consider-the-opposite feedback quality will significantly influence the debiasing mitigation of low anchoring bias influence. There will be a direct linear

relationship between the intervention group's total feedback quality rating and responses to low anchoring bias decision scenarios. (i.e., the higher the feedback quality, the higher the responses.)

Research Question 4 and Hypotheses 4

RQ4: Does attribute framing bias influence the decision-making of K-12 public education administrators in organizational policymaking?

H4: The positive framing bias control group will indicate a significantly higher mean propensity to select the given decision option than will the negative framing bias control group.

Research Question 5 and Hypotheses 5a and 5b

RQ5: Does a consider-the-opposite debiasing intervention mitigate the influence of attribute framing bias in decision-making of K-12 public education administrators in organizational policymaking?

H5a: The positive framing bias control group will indicate a significantly higher mean propensity to select the given decision option than will the positive framing bias intervention group.

H5b: The negative framing bias control group will indicate a significantly lower mean propensity to select the given decision option than will the negative framing bias intervention group.

Research Question 6 and Hypotheses 6a and 6b

RQ6: Does the quality of consider-the-opposite feedback influence the effectiveness of the consider-the-opposite debiasing intervention in mitigating the influence of attribute framing bias?

H6a: Consider-the-opposite feedback quality will significantly influence the debiasing mitigation of positive framing bias influence. There will be an inverse linear relationship between the intervention group's total feedback quality rating and responses to positive framing bias decision scenarios. (i.e., the higher the feedback quality, the lower the responses.)

H6b: Consider-the-opposite feedback quality will significantly influence the debiasing mitigation of negative framing bias influence. There will be a direct linear relationship between the intervention group's total feedback quality rating and responses to negative framing bias decision scenarios. (i.e., the higher the feedback quality, the higher the responses.)

Definition of Key Terms

Key terms include qualitative phenomena and quantitative variables. In the qualitative study, decision-making behavior was the phenomenon described by former K-12 public education administrators in an online interview questionnaire. The qualitative interview questionnaire elicited open-ended text data regarding types and examples of decisions made in domains of personnel management and organizational policymaking. In the quantitative study, which entailed a quasi-experimental design, there were independent variables, dependent variables, interventional variables, and covariates. Key terms related to these quantitative variables include the independent variable of cognitive bias, specifically the influences of anchoring bias and attribute framing bias; and the consider-the-opposite debiasing interventional variable.

Decision-Making in Domains of Personnel Management & Organizational Policymaking

Decision-making behavior was the core phenomenon explored in the qualitative study. Like all public administrators, K-12 public education administrators—school district superintendents and school principals—make decisions in domains of personnel management and organizational policymaking. The context in which public administrators make such decisions, however, is expected to vary from sector to sector.

The qualitative research study, therefore, was designed to target the K-12 public education sector. The study sample was delimited to former school district superintendents and school principals.

The quantitative data collection instrument—an online structured written interview questionnaire—was designed to elicit types and examples of decisions made within each target domain. In the domain of personnel management, interview questions elicited types and examples of decisions related to hiring, evaluations, disciplinary action, and other types of personnel decisions. In the domain of organizational policymaking, interview questions elicited types and examples of decisions related to personnel, student, curricular, budgeting, and other types of policies.

Cognitive Bias

The human mind tends to intuitively rely on heuristics, or mental shortcuts, in order to simplify complex information and make more efficient decisions (Kahneman, 2011; Tversky & Kahneman, 1973; Weinstein, 2003). Heuristics are mediated by cognitive biases that minimize constraints of time and energy (Haselton, Nettle, & Murray, 2016), yet can have maladaptive consequences for judgments and choices. Such notions as bounded rationality illustrate how heuristics constrain decision-making (Simon as cited in Weinstein, 2003). From an evolutionary

standpoint, heuristics serve as a protective cognitive mechanism, so that humans can make efficient decisions for survival (Haselton et al., 2016). These heuristic-based decisions result from intuition, a natural human quality that cannot be discounted (Kahneman, 2011; Kahneman & Klein, 2009). Nevertheless, decision-makers should be aware that cognitive bias takes hold when heuristics cause systematic errors in judgment, that is, predictable departures from rational decision-making. Some researchers estimate that more than 100 cognitive biases exist (Jenicek as cited in Croskerry et al., 2013a), providing a basis for understanding how decision-making can deviate from rationality.

Conceptualization and operationalization of cognitive bias and debiasing mitigation were based primarily on Kahneman's (2003; 2011) version of dual process theory, a framework which differentiates *System 1* and *System 2* cognitive processing. *System 1* cognitive processing refers to immediate, intuitive decision-making, whereas *System 2* cognitive processing refers to deliberate, effortful decision-making. *System 1* cognitive processing can result in irrational decision-making in cases where deliberate, effortful *System 2* cognitive processing would lead to better outcomes. In the literature on cognitive bias, dual process theories tend to be normative, where *System 2* processing is preferred and *System 1* processing is problematic (Evans & Stanovich, 2013). However, decision-making is contextual and not inherently good or bad.

Anchoring Bias

Accessibility bias, which conceptually underlies *anchoring bias*, is the latent cognitive tendency to rely on immediately available information to reduce the complexity of decision-making (Battaglio et al., 2018; Furnham & Boo, 2011; Kahneman, 2003; Mussweiler, Strack, & Pfeiffer, 2000). Immediately accessible information may be internally or externally elicited when primed by anchoring bias (Epley & Gilovich, 2006; Kahneman, 2011). Anchoring bias often

involves a heuristic called *insufficient anchor adjustment*, where a decision-maker relies on readily accessed numerical data on which to base an estimate or judgment, such as data that is salient to the decision-maker due to personal experience or environmental happenstance (Bazerman as cited in Van de Ven, 2007; Epley & Gilovich, 2006; Kahneman, 2011; Tversky & Kahneman, 1973).

Anchoring bias was operationalized as the cognitive tendency to name or estimate an unknown quantity that is lower (or higher) than a rational estimate when presented with an arbitrary too-low (or too-high) reference value (Bellé, Cantarelli, & Belardinelli, 2018; Kahneman, 2011; Nagtegaal et al., 2020; Tversky & Kahneman, 1973; Tversky & Kahneman as cited in Furnham & Boo, 2011). For example, imagine a study in which respondents are asked to estimate the capacity of a venue that can hold 500 people. If one group of respondents is told that the average number of people in the venue is 50, this group is influenced by low anchoring bias. If another group of respondents is told that the average number of people in the venue is 450, that group is influenced by high anchoring bias. When anchoring bias takes hold, the low anchoring bias group would, on average, estimate a lower venue capacity than would the high anchoring bias group.

Attribute Framing Bias

Loss aversion bias, which conceptually underlies *framing bias,* is the latent cognitive tendency to become more risk averse as the perception of potential loss increases, except in cases of probability framing (Kahneman & Tversky, 1979). In practice, loss aversion bias influences decisions about monetary or other numerical data based on *how the data is framed*, whether in negative or positive terms as in attribute framing (Kahneman & Tversky, 1979). In prospect theory, a central tenet about loss aversion bias is that *losses loom larger than gains* (Kahneman,

2011; Kahneman & Tversky as cited in Wu, Van Dijk, Aiken, & Clark, 2016), meaning that the expectation of regret over losing something of value (e.g., a monetary asset) tends to weight decisions toward risk-aversiveness more than does the expectation of satisfaction in gaining something of equal value.

Attribute framing bias was operationalized as the cognitive tendency to make choices that reflect the valence-frame of data presentation, whether in positive or negative terms (Kahneman, 2011; Tversky & Kahneman, 1990). In other words, people tend to be positively primed by, and thus more receptive to, information that is framed positively; whereas people tend to be negatively primed by, and thus less receptive to, information that is framed negatively (Seta, Seta, & McCormick, 2019). For example, consumers who are told that a medicine is 90% effective [positive framing] are more likely to purchase it than are consumers who are told that the medicine is 10% ineffective [negative framing].

Consider-the-Opposite Debiasing Intervention

To mitigate the adverse influences of anchoring bias and attribute framing bias, a consider-the-opposite debiasing intervention was hypothesized as a *System 2* nudge, that is, a means to elicit effortful deliberation in decision-making (Battaglio et al., 2018; Dudley & Xie, 2019; Sunstein, 2016; Thaler & Sunstein, 2021). This type of debiasing intervention aims to modify the individual decision-maker (Adame, 2015; Battaglio et al., 2018; Nagtegaal et al., 2020) by eliciting effortful *System 2* deliberation to mitigate immediate *System 1* reflexivity (Arkes, 1991; Battaglio et al., 2018; Kahneman, 2003; Sunstein, 2016). Such after-the-fact debiasing strategies are *ex post* interventions, which raise the consciousness of the decision-maker after information has been presented, and which prompt the decision-maker to deliberate using *System 2* cognitive processing (Kahneman et al., 2021).

Consider-the-Opposite Debiasing Intervention for Anchoring Bias

In the anchoring bias decision scenarios, a consider-the-opposite debiasing strategy served as an *ex post* intervention (Kahneman et al., 2021), which prompted respondents to explicitly cite two reasons why others would challenge their decision (i.e., contrary reasons). The influences of low anchoring bias and high anchoring bias were hypothesized to prime the decision-maker toward making estimates that are, respectively, lower or higher than a plausible estimate (Kahneman, 2011). To counter the anchoring bias influence, a consider-the-opposite debiasing intervention prompted decision-makers to overcome reflexive suggestibility—being influenced by arbitrary information made salient to the decision-maker—by having to explicitly confront this tendency (Adame, 2015; Croskerry et al., 2013).

Consider-the-Opposite Debiasing Intervention for Attribute Framing Bias

As described for anchoring bias above, in the attribute framing bias decision scenarios, a consider-the-opposite debiasing strategy served as an *ex post* intervention (Kahneman et al., 2021), which prompted respondents to explicitly cite two reasons why others would challenge their decision (i.e., contrary reasons). The influences of positive framing bias and negative framing bias were hypothesized to prime the decision-maker toward the propensity to accept or reject the given course of action, according to, respectively, its positive or negative framing (Kahneman, 2011). To counter the attribute framing bias influence, a consider-the-opposite debiasing intervention nudged decision-makers to overcome their immediate judgment—being influenced by the positively or negatively framed information—by having to explicitly confront this tendency.

Design Delimitations and Limitations

Delimitations

This dissertation research study design was delimited by the target decision domains and the sampling frame. Decision domains of personnel management and organizational policymaking were selected in order to partially replicate prior experiment research on the influences of anchoring bias and attribute framing bias in these domains. The influences of these two cognitive biases have been empirically observed in these decision domains, as discussed in the *Literature Review* chapter. This dissertation research study aimed to partially replicate and extend such experimental studies with a novel study sample and public sector location: K-12 public education administrators in Pennsylvania, as elaborated below.

In terms of the sampling frame, former K-12 public education administrators were purposively sampled for the qualitative study, whereas currently practicing K-12 public education administrators were quasi-randomly sampled for the quantitative study. In both studies, recruited participants included public school district superintendents and school principals in head and assistant positions, where results of the qualitative study were utilized to hone the scope and content of decision scenarios presented to quantitative study participants. This mixed-method sampling design was undertaken mainly to increase the validity of the quantitative study, such that decision scenarios were made germane to these administrators' decision-making contexts and the types of decisions they routinely make. In addition, the qualitative study was conducted to determine relevant decision-making examples in part due to observed flaws in prior public administration research, in which the decision scenarios posed to study participants were not always germane to the participants' real-world professional decision-making contexts.

Limitations

The most salient research study limitations relate to the timing and sample for the qualitative and quantitative data collection. The data collection periods occurred during the peak of the COVID-19 pandemic, from August 2021 to March 2022. Unprecedented political pressure on K-12 public education administrators in Pennsylvania likely inhibited quantitative data collection from January to March 2022. In anticipation of this limitation, a quasi-experimental design was employed to obtain quantitative data through concurrent but disjointed strands of data collection. The first strand entailed direct email recruitment of currently practicing school district superintendents and school principals in Pennsylvania. The second and third strands entailed recruitment assisted by two state-level professional organizations who distributed recruitment emails to their members. Further elements of the quasi-experimental design are elaborated as limitations in the *Discussion* chapter.

In addition, there were study limitations as expected for any experimental design due to potential for confounding variables in the data analysis. In anticipation of this limitation, data relating to participant characteristics were obtained from quantitative study participants for potential inclusion as covariates in multivariate analysis (e.g., age, years in current position, school district size). As explained in the *Data and Methods* chapter, participant age was selected for inclusion as a covariate in multiple regression modeling. However, as elaborated in the *Discussion* chapter, aside from covariates related to participant characteristics, other confounding variables might have exerted influence on the dependent variable. For instance, other or additional cognitive biases might have influenced study participants in various decision scenarios, such as isomorphism bias or status quo bias, as elaborated in *Limitations* in Chapter V.

Summary and Organization of Remaining Chapters

This *Introduction* chapter provided an overview of the dissertation study purpose, its roots in the cognitive bias literature, and a problem statement describing the potential pitfalls of cognitive bias in public administrator decision-making. As the *Literature Review* chapter delineates, the mixed-method study design was rooted in a history of interrelated theoretical frameworks from bounded rationality theory, for which the dissertation is titled, to relatively recent behavioral public administration theory. Next, the *Data and Methods* chapter describes the rationale for and design of the qualitative and quantitative studies. Each study has its own subchapter which entails the research questions, hypotheses (for the quantitative study only) design rationale, research sample and context, and data analysis justification. Then, the *Data Analysis and Results* chapter reports on the findings of the qualitative and quantitative studies. Lastly, the *Discussion* chapter provides an interpretation of study results, theoretical and practical implications, and recommendations for future public administration research and practice.

Chapter II: Literature Review

Literature Review Overview

The literature review situates this dissertation research study of cognitive bias influences and debiasing interventions in the context of public administration. First, an overview of behavioral public administration demonstrates the need and potential for quasi-experimental and experimental research on cognitive bias and debiasing interventions in public-sector decision-making. Second, a discussion of five theoretical frameworks for cognitive bias in decision-making sets the stage for the research study rationale. Third, the cognitive biases under experiment—attribute framing bias and anchoring bias—are illustrated in the context of extant experimental research in the social sciences in general and in public administration in particular. Fourth, theoretical frameworks of debiasing interventions are discussed, along with extant social science research that has evaluated several types of debiasing interventions. Lastly, delineated are the rationale for evaluating a consider-the-opposite debiasing intervention in this research study, and acknowledgement of debiasing limitations.

Behavioral Public Administration

Any discussion of behavioral public administration rightfully pays homage to early public administration scholars like Herbert Simon (Grimmelikhuijsen et al., 2016), who called for behavioral science research to explain and verify how public administrators, like all humans, are prone to irrational decision-making (Simon, 1946, 1947; Todd & Gigerenzer, 2003). Nevertheless, since Simon (1947, 1955, 1956) challenged expected utility theory and thus proposed bounded rationality theory in its place, public administration researchers have not adequately responded to the call to integrate behavioral science studies into public administration research. Meanwhile, parallel disciplines such as behavioral economics and political psychology

have charged forward to observe decision-making empirically, and to produce several key theories that explain a host of cognitive biases now accepted as valid and practical in the economics and political science literatures (Battaglio et al., 2018; Congdon et al., 2011; Grimmelikhuijsen et al., 2016; Kahneman, 2011; Thaler, 1980; Thaler & Benartzi, 2004; Tversky & Kahneman, 1973, 1981, 1990, 1992).

Although behavioral public administration encompasses a range of quantitative and qualitative methodologies, experimental research designs that build on the behavioral dimensions of public-sector decision-making are gaining traction and attention. However, because public administration researchers frequently import and evaluate theories from other disciplines—as our field is interdisciplinary by nature (Riccucci, 2010)—these researchers are now beginning to establish a commensurate set of theories to export to other disciplines, or to establish as interdisciplinary but rooted foremost in public administration practice (Battaglio et al., 2018). Therefore, at the intersection of public administration and behavioral science, there is potential to actualize experimental findings to inform improvements to public decision-making practices, as with mitigation of cognitive bias in the consequential task of public policymaking. Furthermore, as experimental replication in public administration research is growing but still relatively sparse (Walker, James, & Brewer, 2017), behavioral public administration researchers should build on the experimental momentum toward empirical generalization of cognitive bias influences and debiasing interventions in decision-making across multiple public sector contexts.

Cognitive Bias Experimentation as Key Facet of Behavioral Public Administration

Behavioral public administration research lends itself to observation of individual decision-making in organizational and/or political contexts, which could bring psychological phenomena like cognitive bias to the consciousness of researchers and practitioners

(Grimmelikhuijsen et al., 2016). Thus far, behavioral public administration researchers have put questions to the test about how cognitive biases influence the decision-making of public administrators in domains of finance, policymaking, personnel management, and general administration (Bellé et al., 2017; Bellé, Cantarelli, & Belardinelli, 2018; Battaglio et al., 2018; Cantarelli et al., 2020; Congdon et al., 2011). Experimental studies that have investigated how cognitive biases influence decisions made by judges, regulators, public servants, elected officials, and public personnel managers set the stage for replication and extension of descriptive studies of cognitive bias in public-sector decision-making, and of experimental studies that evaluate debiasing interventions that aim to mitigate the adverse effects of cognitive bias in public-sector decision-making (Anderson & Hjortskov, 2016; Battaglio et al., 2018; Bellé, Cantarelli, & Belardinelli, 2018; Cantarelli et al., 2020; Dudley & Xie, 2019).

Such researchers have called for study replication and parallel experimental studies to evaluate: (1) debiasing interventions that mitigate cognitive biases in *additional* public administration contexts (Battaglio et al., 2018; Bellé, Cantarelli, & Belardinelli, 2018; Lilienfeld et al., 2009); (2) a *wider range* of cognitive biases and/or debiasing interventions in a single study (Battaglio et al., 2018; Cantarelli et al., 2020); and (3) findings from randomized-controlled experiments in *natural settings*, so to increase the external validity of results (Battaglio et al., 2018; Bellé, Cantarelli, & Belardinelli, 2018; Nagtegaal et al., 2020). If researchers can understand how to mitigate cognitive biases that commonly cause systematic errors in judgment—even in small-scale, controlled experiments—then practical implications could include better-informed policymaking and policy analysis; improved personnel and resource management; and more deliberate day-to-day managerial decision-making amid

competing information, institutional constraints, and external pressures (Battaglio et al., 2018; Belardinelli et al., 2018; Cantarelli et al., 2020; Dudley & Xie, 2019; Nagtegaal et al., 2020).

Given the extant experimental research on the influence of cognitive biases and debiasing interventions, this dissertation author responded to the call for experimental study replication with a survey-in-the-field approach (Bellé, et al., 2018). This approach represents an intermediary step between quantitative randomized-controlled experimental studies and qualitative natural field experiments (Bellé, et al., 2018). The behavioral public administration literature includes a multitude of survey experiments that have evaluated cognitive bias in decision-making by public administrators and citizens (Battaglio et al., 2018). However, as far as is known, Cantarelli and colleagues (2020) have conducted the field's only survey-in-the-field experiment, which evaluated the influence of cognitive biases on public administrator decision-making in policymaking, personnel evaluation, and general management in the public healthcare sector in Italy.

Cantarelli and colleagues (2020) observed the influence of eight cognitive biases, including the two evaluated by this dissertation research study—anchoring bias and attribute framing bias—while evaluating an instructive warning type of debiasing intervention on only five of the cognitive biases (Cantarelli et al., 2020). Their findings suggest that, although framing bias and two other cognitive biases were amenable to this debiasing intervention, anchoring bias was not amenable to it (Cantarelli et al., 2020). Nevertheless, results may have been confounded by over-influence of the cognitive biases due to a mixed sampling of nurses on managerial, front-line, and assistant levels, rather than a sampling of nurse managers alone. In other words, the validity of their study results would have increased had decision scenarios been relevant to all research participants; for instance, had personnel and management decision scenarios been tested

with only nurse managers, who make such decisions as part of their routine duties, whereas front-line nurses do not.

Moreover, this dissertation research study focused on the K-12 public education sector, in which experimental research on cognitive bias in administrator decision-making has been sparse, with only five known published studies. To summarize, these prior studies focused on the influence of cognitive bias on school principals when evaluating their school's performance; on public officials when evaluating budgeting and policy reform, or attribution of leader responsibility; and on school district superintendents when choosing between software programs (Battaglio et al., 2018). As for decision-making by school principals, one study was conducted in the United States (Texas) and Denmark, evaluating over-optimism bias in school performance evaluations (Meier, Winter, O'Toole, Favero, & Andersen, 2015). A related study was conducted in Denmark, evaluating negativity bias in principals' school performance evaluations vis-á-vis managerial responsiveness to these evaluations (Holm, 2017). As for decision-making by public officials in the education sector, two studies were conducted in Denmark. One study observed negativity bias in public official's attitudes toward spending and policy reform (Nielsen & Baekgaard, 2015). Another study observed negativity bias in public officials' attribution of responsibility to appointed leaders in the public education sector (Nielsen & Moynihan, 2017). Lastly, as for decision-making by school district superintendents, one study was conducted in Italy, evaluating isomorphism in software product choice (Bellé, Belardinelli, Cantarelli, & Mele, 2018). No known published behavioral public administration research in the K-12 public education sector has evaluated any debiasing intervention strategy.

This dissertation research study, therefore, was dedicated to replicating prior social science research designs and conducting a survey-in-the-field including decision domains—

personnel management and organizational policymaking—that targeted K-12 public education administrators who make such decisions. This dissertation research study also evaluated a debiasing intervention called *consider the opposite*, which in prior experimental studies was found to significantly mitigate the two cognitive biases under experiment in this study, as discussed subsequently. The quantitative research study was designed to answer two overarching research questions: *Do **anchoring bias or attribute framing bias** influence the decision-making of K-12 public education administrators? Does a consider-the-opposite debiasing intervention mitigate the influences of **anchoring bias or attribute framing bias** in the decision-making of K-12 public education administrators?*

Theoretical Frameworks: Cognitive Bias in Decision-Making

Undergirding this research design are theoretical frameworks that explain how human decision-making is influenced by cognitive bias; that is, decision-making under conditions of complexity and uncertainty. Each framework contributes to the theory of change, informing the view of a public problem—the adversely consequential influence of cognitive bias in public administrator decision-making—and seeking to evaluate a consider-the-opposite debiasing intervention. If the intervention is found effective, it could be scaled up and implemented in the formal training and regular practice of public administrator decision-making. The following sub-sections are summaries of five interrelated theories that contribute to an understanding of how humans *actually* make decisions with respect to cognitive bias. In historical order, these theories are: bounded rationality theory, prospect theory, behavioral economics theory, dual process theory, and nudge theory.

Bounded Rationality Theory

The change sought by this dissertation research study begins with understanding how humans process information and make decisions. In the public administration field, this theoretical discussion started with Herbert Simon's (1946; 1955) bounded rationality theory, which holds that there are observable, predictable limits to rational decision-making, such as insufficient information; inadequate computation ability; unconscious thoughts and habits; and personal values and preferences. Furthermore, for Simon (1955), human decision-making is only analogous to logical reasoning, since a decision-maker has goals and values that personally bias the decision. Hence, at best, a decision-maker can infer information from others or from the environment, which is likely inaccurate and incomplete, thereby misperceiving facts and miscalculating future outcomes (Simon, 1955).

Bounded rationality theory challenged then-dominant expected utility theory, a variant of rational choice theory (Simon as cited in Cook, Levi, O'Brien, & Faye, 1990) and the rational-comprehensive decision-making model (Birkland, 2020; Forester, 1984). In brief, expected utility theory in economics and other disciplines assumes that, in the vein of utilitarianism, decision-makers operate in ideal conditions: that is, they know what they want or need; maximize the benefit of their decisions; understand the best course of action among alternatives; and possess complete information and the cognitive aptitude to achieve those aims (Bellé, et al., 2018; Congdon et al., 2011; Elster, 1990; Kahneman, 2011; Tversky & Kahneman, 1990; Simon, 1985; Weimer & Vining, 2017). Key tenets of expected utility theory (EUT) include normative assumptions—the way humans *should* make decisions—that are violated by the two cognitive biases under experiment in this study (Weimer & Vining, 2017). Decisions influenced by framing bias violate EUT tenets of (1) *invariance:* humans perceive objectively equivalent information in

the same way despite variation in data presentation; and (2) *dominance:* humans accurately predict future outcomes based on given probabilities (Tversky & Kahneman, 1990). By inference, decisions influenced by anchoring bias violate the EUT tenet of *transitivity:* humans consistently choose in accordance with their preferences regardless of varying choice sets (e.g., if A is chosen over B, and B is chosen over C, then A will be chosen over C).

Bounded Rationality Theory in Political Contexts

As research evidence against expected utility theory accumulated, Simon (1946) called for integration of behavioral science research into the formal study of public administration, such as to, among other goals, discover ways to overcome biases that lead to the bounding of rational decision-making (Kahneman, 2003; Simon as cited in Nagtegaal et al., 2020). About forty years thence, Simon (1985) expressly called for experimental research in political science on the rationality-bounding phenomena of evocation (e.g., emotional arousal) and selective attention, which relate directly to attribute framing bias and anchoring bias, respectively, in order to improve upon the decision-making of *Homo politicus,* the political decision-maker. During these latter years, Simon (1985) reframed bounded rationality as common irrationality, acknowledging that decisions in the political context typically lack rational elements of logic, deliberation, impartiality, and comprehensive attention, even though the underlying decision-making rationale may be justifiable on political grounds. This notion was explicated by Todd and Gigerenzer (2003) in redefining Simon's original version of bounded rationality as the decision-maker's fitting a decision to his or her environment, thereby reframing bounded rationality as more rational and, importantly, more within the decision-maker's conscious control.

Furthering bounded rationality theory in the political context, Forester (1984) agrees with Simon that a rational-comprehensive decision-making model falls short of describing or

predicting how decision-making actually happens in public, and thus political, contexts. However, Forester (1984) objects to Simon's narrow conceptualization of a cognitively bounded decision-maker who makes decisions in relative isolation. Instead, Forester (1984) qualifies the original conception of bounded rationality by categorizing four distinct contexts of decision-making, each with attendant constraints (e.g., time, setting, information) and degrees of boundedness: (1) cognitive limitations on the individual decision-maker (à la Simon); (2) multiple social spheres of decision-making; (3) pluralism of competing decision-makers; and (4) power-differentiated, information-asymmetric decision-making. The key distinction here is that public-sector decision-makers are not independent of their political contexts, and, moreover, political power in the United States context is inequitably distributed, favoring those with the means to influence political decision-making, be it monetary or socio-political means.

Therefore, any theory of public-sector decision-making ought to consider the variables that influence decision-making in this context—as opposed to evaluating rational decision-making on technical, individualistic grounds—variables such as the complex, fluctuating influences of political pressure and competing socio-political interests. For the purposes of this dissertation research study, the quantitative survey-in-the-field decision scenarios were designed to isolate the influence of cognitive biases as in Simon's conceptualization of bounded rationality as far as possible, but also to integrate the political and institutional contexts of K-12 public education in which administrators seldom make decisions in isolation. This latter conclusion was borne out by this dissertation's qualitative data analysis of interviews with former K-12 public education administrators. Further, the quantitative data collection involved potential covariates like the study participant's age, school district size, and number of years as a practicing K-12

public education administrator, in order to account for confounding variables that could influence the decision-maker in addition to the influences of anchoring bias and attribute framing bias.

Bounded Rationality Theory as a Bridge to Cognitive Bias Research

As implicated by bounded rationality theory, abounding empirical evidence across multiple social science disciplines has demonstrated that humans tend to exhibit irrational decision-making when faced with complexity and uncertainty (Bazerman as cited in Van de Ven, 2007; Battaglio et al., 2018; Kahneman, 2000, 2003, 2011; Kahneman & Tversky, 1973; Levi, Cook, O'Brien, & Faye, 1990; Thaler, 1980; Tversky & Kahneman, 1973, 1981; 1990; 1992). Synthesis of these research findings has concluded that humans are observably susceptible to an identified 100 or more individual-level cognitive biases, which serve to simplify complex decisions but result in systematic errors in judgment (Benson as cited in Nagtegaal et al., 2020; Jenicek as cited in Croskerry et al., 2013a). Most prominent in the theoretical description and explanation of cognitive bias in decision-making are prospect theory, behavioral economics theory (Bellé, Cantarelli, & Belardinelli, 2018; Congdon et al., 2011; Kahneman & Tversky, 1979; Pickett, Barnes, Wilson, & Roche, 2019; Tversky & Kahneman, 1992), and dual process theory, namely Kahneman's version (Evans & Stanovich, 2013; Kahneman, 2003). These theories have established a basis for the experimental study of cognitive bias in decision-making in behavioral public administration research (Battaglio et al., 2018; Cantarelli et al., 2020; Heath et al., 1998; Mintrom, 2015; Nagtegaal et al., 2020). Therefore, the time is ripe for concerted efforts to conduct experimental studies that aim to describe and mitigate the influence of various cognitive biases in public-sector decision-making.

Prospect Theory

With formulation of prospect theory, Kahneman and Tversky (1979) laid the groundwork for cognitive bias explanations in behavioral economics theory (Congdon et al., 2011; Kahneman, 2011). This upending theory accounts for actual economic decision-making behavior, rather than idealized or normative rational economic decision-making behavior as in expected utility theory and prescribed by the standard economics model (Tversky & Kahneman, 1992). Prospect theory rests on the concept of loss aversion bias and predicts how humans make decisions with respect to anticipated gains or losses under conditions of uncertainty (Kahneman & Tversky, 1979; Pickett et al., 2019; Wu et al., 2016). According to the theory, humans tend to follow systematic patterns of decision-making depending on the perception, or prospect, of losing or gaining something of value. In practice, loss aversion bias influences decisions about monetary or other numerical data, based on (1) *how the data is presented*, whether in absolute or probabilistic terms; (2) *how the data is framed*, whether in negative or positive terms; and (3) *how expected gains or losses are evaluated against a reference point* (Kahneman & Tversky, 1979).

When loss aversion bias takes hold, human decision-making tends toward inequitable risk aversiveness, because the prospect of loss carries more weight in decision-making than the prospect of gain, whether losses and gains are actual *or perceived* (Kahneman & Tversky, 1979). The perception of potential loss or gain can be manipulated by the framing of information, as with attribute framing, which is the positive or negative framing of objectively equivalent data. For instance, the influence of attribute framing bias on economic decision-making was demonstrated in a study showing that people indicated intentions to spend tax money given to them consistent with how the giving was framed (Epley, Mak, & Idson, 2006). When a tax cut

was framed as a bonus, people were more willing to spend the money, because it was perceived as a gain; whereas when it was framed as a rebate, people were less willing to spend the money, because it was perceived as restoration of a prior asset (Epley et al., 2006). Loss aversion and attribute framing bias are further discussed below in the sub-section under the *Cognitive Biases under Experiment* section.

Furthermore, aside from economic decisions about data, "[prospect theory] is readily applicable to choices involving other attributes, e.g., quality of life or the number of lives that could be lost or saved as a consequence of a policy decision" (Kahneman & Tversky, 1979, p. 288), which is relevant to public-sector decision-making. Hence, this dissertation research study evaluated attribute framing bias in the context of public organizational policymaking, in which the perception of information, and thus decision-making, can be hypothetically altered by framing the data either positively or negatively. This research study replicates prior experimental research that demonstrated the influence of attribute framing bias on decision-making (Adame, 2015; Bellé, Cantarelli, & Belardinelli, 2018; Kahneman, 2011; Tversky & Kahneman, 1981), and the effectiveness of a consider-the-opposite debiasing intervention to mitigate attribute framing bias (Cheng, Wu, & Lin, 2014; Seta et al., 2020).

Behavioral Economics Theory

As aforementioned, behavior economics theory stems from prospect theory. Whereas standard economics theory assumes that humans are rational, utility-maximizing individuals that follow predictable patterns of behavior as consumers, taxpayers, investors, and the like, evidence from behavioral economics research has refuted these assumptions (Congdon et al., 2011; Kahneman, 2011; Kahneman & Tversky, 1979; Sunstein & Thaler, 2003; Tversky & Kahneman, 1990). Behavioral economics theory builds on Simon's bounded rationality theory, but it offers

additional explanations for the irrational decision-making that leads humans astray from the *homo economicus* (e.g., economic decision-maker) ideal assumed by the standard economics model. An important distinction is that behavioral economics theory does not fully subscribe to Simon's (1985) notion that humans are merely bounded from 100% rational decision-making to a lesser degree of rationality, the bounding of which results mainly from selective attention, emotional arousal, and inadequate computational capacity.

By contrast, behavioral economics theory explains suboptimal or irrational decision-making in terms of the heuristics, or mental shortcuts, that humans employ intuitively as an evolutionary adaptation that minimizes the costs of time and energy in decision-making under conditions of complexity and uncertainty. Research by its prime theorists— Kahneman, Tversky, Thaler, and Sunstein—has substantiated these explanations using empirical methods, and has identified observable, measurable cognitive biases that have since become prevalent in the literature of behavioral economics and other disciplines (Congdon et al., 2011; Kahneman & Tversky, 1979; Oliver, 2015; Sunstein & Thaler, 2003; Thaler, 1980; Thaler as cited in Pickett et al., 2019; Tversky & Kahneman, 1973, 1981, 1990). Two such cognitive biases were evaluated empirically in this study: loss aversion bias, which underlies attribute framing bias; and accessibility bias, which underlies anchoring bias.

Dual Process Theory

Dual process theory informs the understanding of how humans mentally process information and make systematic errors in decision-making due to cognitive bias. The term *dual process* refers to the theoretical differentiation between *System 1* cognitive processing and *System 2* cognitive processing (Crosskery et al., 2013a; Evans & Stanovich, 2013: Kahneman, 2003, 2011). Among various dual process theories, Kahneman's (2003) version is the theoretical

basis for this study. In his conceptualization, systematic errors are misjudgments that occur when heuristics, or mental shortcuts, prompt *System 1* cognitive processing, resulting in intuitive, immediate, and self-protective responses, as *System 1* processing taps the brain's primitive cognitive mechanisms (Evans & Stanovich, 2013; Kahneman, 2003, 2011). In practice, a systematic error is a predictable deviation from rational decision-making (Bellé, Cantarelli, & Belardinelli, 2018; Kahneman, 2003, 2011; Thaler, 1980; Thaler & Sunstein, as cited in Bellé, Cantarelli, & Belardinelli, 2018). Because humans rely heavily on *System 1* cognitive processing—95% of the time, by one estimate (Lakoff & Johnston as cited in Crosskery et al., 2013a)—cognitive bias causes decision-makers to err systematically, that is, to make irrational judgments with predictable regularity (Evans & Stanovich, 2013; Kahneman, 2003, 2011; Thaler, 1980).

By contrast, *System 2* cognitive processing employs deliberation, logic, and reflection; and it has been hypothesized as a mechanism to enable decision-makers to mitigate cognitive bias, when the mechanism is either self-initiated or externally elicited (Crosskery, Singhal, & Mamede, 2013b; Evans & Stanovich, 2013; Kahneman, 2003, 2011). Although human intuition should not be discounted (Kahneman, 2011; Kahneman & Klein, 2009), decision-makers should seek to avoid reliance on *System 1* cognitive processing. In other words, one should attend to and discover how to mitigate adversely consequential decision-making scenarios in which humans tend to rely on intuitive mental shortcuts, when instead effortful deliberation is warranted (Adame, 2015; Battaglio et al., 2018; Bellé, Cantarelli, & Belardinelli, 2018; Crosskery et al., 2013a, 2013b; Kahneman, 2003; 2011; Lilienfeld et al., 2009; Nagtegaal et al., 2020).

Nudge Theory

In the domain of public administration, nudge theory extends the hypothesis that *System 2* processing deliberation can mitigate *System 1* processing errors in decision-making (Thaler & Sunstein, 2021). The theory proposes that public policy levers like choice framing and choice architecture can *nudge*—or, influence in an intentional direction—people to make better decisions for their own welfare; meaning, as a debiasing mechanism, nudges can help people mitigate or avoid the unintended adverse consequences of cognitive bias in decision-making (Cantarelli et al., 2020; Sunstein, 2016; Sunstein & Thaler, 2003). Nudge theory's assumptions include that public policies are never neutral designs, and furthermore, that policymakers can and should design policies that employ nudges; for instance, by framing choices with specific intent, making welfare-promoting choices readily available (e.g., as defaults), or making helpful information transparent and salient (Thaler & Sunstein, 2021). A drawback of nudging in the public policy domain is that nudges could be, or are perceived to be, manipulative and freedom-limiting (Kuyer & Gordijn, 2023; Oliver, 2015; Sunstein, 2016; Wright & Ginsburg, 2012).

Nudge Theory Applied in the Quantitative Research Study

For the quantitative part, priming and nudging hypothetically influenced decision-makers for the worse and the better, respectively. These influences occurred through the priming of cognitively biased decisions in the control groups, and the nudging of decision-makers in the intervention groups with a consider-the-opposite debiasing intervention. In the three anchoring bias decision scenarios, anchoring bias was elicited by a statement containing a too-low or too-high anchor value, which primed decision-makers in the control group to anchor their decisions to this arbitrary reference value. In other words, decision-makers were hypothesized to be unduly influenced by the too-low or too-high reference value, notwithstanding that the value was

arbitrarily selected. For the intervention group, a consider-the-opposite debiasing intervention was employed to mitigate the influence of anchoring bias, by nudging decision-makers to explicitly cite two reasons why others might challenge their decision—e.g., to *consider the opposite* of their *System 1* immediate decision.

Similarly, in the three attribute framing bias decision scenarios, attribute framing bias was elicited by a statement containing either positively or negatively framed information, which primed decision-makers in the control group to perceive information according to its positive or negative attribution. In other words, although the information was arbitrarily framed positively or negatively, decision-makers were hypothesized to be unduly influenced by the valence framing of logically equivalent data. For the intervention group, a consider-the-opposite debiasing intervention was employed to mitigate the influence of attribute framing bias, by nudging decision-makers to explicitly cite two reasons why others might challenge their decision, in the same vein as for anchoring bias described above.

Cognitive Bias under Experiment: Anchoring Bias

Accessibility bias, which conceptually underlies *anchoring bias*, is the latent cognitive tendency to rely on immediately available information to reduce the complexity of decision-making (Battaglio et al., 2018; Furnham & Boo, 2011; Tversky & Kahneman, 1973). Immediately accessible information may be internally or externally elicited, as primed by anchoring bias (Epley & Gilovich, 2006; Kahneman, 2011). Anchoring bias often involves a heuristic called *insufficient anchor adjustment*, where a decision-maker relies on readily accessed numerical data on which to base an estimate or judgment, such as data that is salient to the decision-maker due to personal experience or environmental happenstance (Bazerman as cited in Van de Ven, 2007; Epley & Gilovich, 2006; Kahneman, 2011; Tversky & Kahneman, 1973).

Anchoring bias can be arbitrarily primed with the intention to manipulate a decision-maker, given the human predilection for suggestibility (Kahneman, 2011). For example, a low-ball job offer could bias a job candidate toward asking for a lower salary than he or she otherwise would have, unless a sufficient anchor adjustment is made upward to a salary level that rationally suits the job candidate's skills and experience.

For this dissertation research study, anchoring bias is operationalized as the cognitive tendency to name or estimate a quantity that is lower (or higher) than a rationally plausible estimate when presented with an arbitrary too-low (or too-high) reference value (Bellé, Cantarelli, & Belardinelli, 2018; Kahneman, 2011; Nagtegaal et al., 2020; Tversky & Kahneman, 1973). Take for instance a case in which decision-makers are asked to estimate the number of people in a large crowd. The decision-makers are split into two groups. One group is simply asked to estimate the number of people in the crowd. The other group is first exposed to an arbitrary too-low (or too-high) number, as given in the statement, *The average crowd in this venue is 100 (or 10,000)*, and then asked to estimate the number of people in the crowd. This arbitrary number—either 100 as a low anchor or 10,000 as a high anchor—serves to anchor the decision-maker's thinking toward an estimate that is, on average, closer to the anchor value than to a rational estimate. By contrast, decision-makers who are not exposed to the anchor value would, on average, estimate a value that is closer to a rational estimate.

Experimental Research on Anchoring Bias in Behavioral Public Administration

Experimental studies on anchoring bias in behavioral public administration are preceded and complemented by rich literature across the social sciences, which has evidenced the ubiquitous, measurable influence of anchoring bias in decision-making (Adame, 2015; Furnham & Boo, 2011; Hirt & Markman, 1995; Kahneman, 2011; Mumma & Wilson, 1995; Mussweiler et

al., 2000; Nagtegaal et al., 2020). Robustness of the anchoring bias phenomenon can be attributed to its roots in human evolution, in contrast to certain biases which are thought to be learned from one's environment (Stanovich as cited in Crosskery et al., 2013a). To observe and describe anchoring bias, multiple experimental studies in behavioral public administration have demonstrated its influence on decision-making by public managers, public servants, and citizens, namely in decision domains of public policymaking and personnel management (Battaglio et al., 2018). Several studies found that anchoring bias significantly influenced such decisions (Bellé et al., 2017; Bellé, Cantarelli, & Belardinelli, 2018; Cantarelli et al., 2020; Feeney, 2012), although other studies found that anchoring bias had a mixed influence on decision-making in these decision domains (Grimmelikhuijsen & Porumbescu, 2017; Pandey & Marlowe, 2015).

In addition, anchoring bias has been experimentally evaluated for its amenability to debiasing mitigation, as by a consider-the-opposite debiasing strategy found to be moderately to significantly effective in reducing the influence of anchoring bias in decisions by public managers (Nagtegaal et al., 2020). Still, further experimental evidence is needed to demonstrate how anchoring bias influences decisions made in domains of personnel management (Bellé et al., 2017) and organizational policymaking (Bellé, Cantarelli, & Belardinelli, 2018), and how a consider-the-opposite debiasing intervention could be effective in mitigating anchoring bias for public administrators in other public sectors (Nagtegaal et al., 2020). Anchoring bias is, therefore, included in this study, to replicate prior experimental studies that evaluated how anchoring bias influences personnel management and organizational policymaking decisions, and to replicate experimental evaluation of a consider-the-opposite debiasing intervention to determine whether this strategy could be generalized to additional public sectors, as in public education administration on which this research study focuses.

To measure anchoring bias and the influence of a consider-the-opposite debiasing strategy, study participants were split into four groups: (1) low anchor control group, (2) low anchor intervention group, (3) high anchor control group, and (4) high anchor intervention group. Each group of participants was provided three decision scenarios in which an anchor value is mentioned with the intention to prime participant responses toward the too-low or too-high anchor value. To evaluate the debiasing intervention, participants in the intervention groups were asked to explicitly *consider the opposite* of the anchor value, in response to the prompt: *Before indicating your answer, please provide 2 reasons why others might challenge your decision.* Intervention group participants were required to type two responses to this prompt. Precise data measurement design for the anchoring bias experiments is discussed in the *Data and Methods* chapter.

Anchoring Bias Decision Scenarios and Hypotheses

To measure anchoring bias and the influence of a consider-the-opposite debiasing intervention, study participants were split into four groups: (1) high anchoring control group, (2) high anchoring intervention group, (3) low anchoring control group, and (4) low anchoring intervention group. Each group of participants was given three decision scenarios in which the presentation of data was accompanied by an arbitrary statement containing a too-high or too-low number, with the intention to prime participants' responses toward a higher or lower response to the decision prompt. To evaluate the debiasing intervention, participants in the intervention groups were asked to explicitly *consider the opposite* in response to the prompt: *Provide two reasons why others might challenge your decision.* Participants were then required to type two such responses to this prompt. Precise data measurement design for the anchoring bias experiments is discussed in the *Data and Methods* chapter. Exact anchoring bias decision

scenario content is presented in Appendix G: Survey-in-the-Field (Quantitative Data Collection Instrument).

Anchoring Bias Decision Scenario #1

In the first anchoring bias decision scenario—partially replicating the anchoring bias studies of Bellé and colleagues (2017); Cantarelli and colleagues (2020); and Nagtegaal and colleagues (2020)—participants were asked to determine the total objective score for a subordinate's annual personnel evaluation. In the prior studies, the low anchor groups were given 52/100 as the subordinate's prior year personnel evaluation total score, whereas the high anchor groups were given 88/100 as the subordinate's prior year personnel evaluation total score (Bellé et al., 2017; Nagtegaal et al., 2020). The median score of 70/100 was considered the rational baseline against which 18 points lower (52/100) or 18 points higher (88/100) were set to ensure a sufficient anchoring bias influence on the decision-makers. 70/100 was established as the baseline, because the personnel evaluation was figured to sum to 70 points based on the combined level of qualities and skills noted in the decision scenario. Study participants indicated a whole digit response using a 0-100 sliding scale in Qualtrics survey software.

Anchoring Bias Decision Scenario #2

In the second anchoring bias scenario—partially replicating Bellé and colleagues (2017); and Nagtegaal and colleagues (2020)—participants were asked to set a policy for the maximum number of business hours that faculty and staff would have to respond to calls and emails from external stakeholders. In the prior studies, the time to respond was measured in days, where the high anchor value was 90 days and the low anchor value was two days (Bellé et al., 2017; Nagtegaal et al., 2020). However, the time to respond was measured in hours mainly to reduce the low anchor value. Also, the 90-day high anchor value was viewed as unreasonably extreme

as compared to the low anchor value, thus the high anchor value was set closer to the baseline. Hence, the low anchoring bias groups were given 12 hours as a benchmark number of hours, whereas the high anchoring bias groups were given 72 as a benchmark number of hours. The median number 48 hours was considered the rational baseline against which 36 hours lower (12) or 24 hours higher (72) were set to ensure a sufficient anchoring bias influence on the decision-makers. Study participants indicated a whole digit response using a 0-100 sliding scale in Qualtrics.

Anchoring Bias Decision Scenario #3

In the third anchoring bias scenario—a novel quasi-experiment designed by the study author—participants were asked to set a policy for the minimum number of days for teacher suspension in cases of educator misconduct toward students. The low anchor groups were given 3 days as a benchmark number of hours, whereas the high anchor groups were given 30 days as a benchmark number of days. The median number 15 days was considered the rational baseline against which 12 days lower (3) or 15 days higher (30) were set to ensure a sufficient anchoring bias influence on decision-makers. Participants indicated a whole digit response using a 0-100 sliding scale in Qualtrics.

Anchoring Bias Decision Scenario Control Group Hypothesis

H1: The high anchoring bias control group will indicate a significantly higher mean response than will the low anchoring bias control group.

Cognitive Bias under Experiment: Attribute Framing Bias

Loss aversion bias, which conceptually underlies *framing bias,* is the latent cognitive tendency to become more risk averse as the perception of potential loss increases, except in cases of probability framing (Kahneman & Tversky, 1979). In practice, loss aversion bias influences

decisions about monetary or other numerical data based on *how the data is framed*, whether in negative or positive terms as in attribute framing, among other reference framing contexts, as discussed in the *Prospect Theory* section above (Kahneman & Tversky, 1979). In prospect theory, a central tenet about loss aversion bias is that *losses loom larger than gains* (Kahneman, 2011; Kahneman & Tversky as cited in Wu et al., 2016), meaning that the expectation of regret over losing something of value (e.g., a monetary asset) tends to weight decisions toward risk-aversiveness more than does the expectation of satisfaction in gaining something of equal value.

The theory holds when the probability of loss and gain are equal (e.g., a 50/50 chance of losing or winning), and even when, probability being equal, the potential gain is as much as twice the potential loss (Kahneman, 2011; Kahneman & Tversky, 1979). Kahneman (2011) describes this tendency toward risk aversiveness as a loss aversion ratio, which on average is 1.5 to 2.5, but it can be higher for those who prefer a sure bet over a slight probability of losing what they already have. The loss aversion phenomenon has been demonstrated physiologically in an experimental study of physiological reactions to gambling scenarios and outcomes. In that study, participants exhibited skin-detected physiological reactions of regret when they lost a bet or *nearly* lost a bet, and of relief when they won a bet or *nearly* won a bet; and confirming loss aversion theory, in all instances of losses vs. gains, the magnitude of skin-detected emotional reaction was greater for losses or *near losses* than for gains or *near gains* (Wu et al., 2016).

For this dissertation research study, attribute framing bias is operationalized as the cognitive tendency to make choices that reflect the valence-frame of data presentation, whether in positive or negative terms (Kahneman, 2011; Tversky & Kahneman, 1990). In other words, people tend to be positively primed by, and thus more receptive to, information that is framed positively; whereas people tend to be negatively primed by, and thus less receptive to,

information that is framed negatively (Kahneman, 2011; Seta et al., 2019). Consider the following example of attribute framing. One group of people is exposed to the positively framed statement, *70% of Americans approve of the President*. Another group of people is exposed to the negatively framed statement, *30% of Americans disapprove of the President.* When attribute framing bias takes hold and political affiliation is held constant, raters in the positive framing bias group will, on average, indicate a President approval rating higher than raters in the negative framing bias group will indicate, even though the positively and negatively framed statements are logically equivalent [70% approve = 30% disapprove].

Experimental Research on Attribute Framing Bias in Behavioral Public Administration

To observe and describe attribute framing bias, multiple experimental studies in behavioral public administration have demonstrated its influence on decision-making by public managers, public servants, and citizens, namely in decision domains of personnel management, public policymaking and policy reform, and organizational management and policymaking (Battaglio et al., 2018). Multiple studies found that attribute framing bias significantly influenced such decisions (Baekgaard, 2017; Bellé, Cantarelli, & Belardinelli, 2018; Cantarelli et al., 2020; Fuenzalida, Van Ryzin & Olsen, 2020; Grosso, Charbonneau, & Van Ryzin, 2016; Hjortskov, 2017; Olsen, 2015), although other studies found that attribute framing bias had a mixed or non-significant influence on decision-making in these domains (Belardinelli et al., 2018; Gilad, Bloom, & Assouline, 2018).

In addition, attribute framing bias has been experimentally evaluated for its amenability to debiasing mitigation, as elicited by consider-the-opposite debiasing interventions found to be significantly effective in reducing the influence of framing bias (Cheng et al., 2014; Seta et al., 2019; Nagtegaal et al., 2020). Still, further experimental evidence is needed to demonstrate how

attribute framing bias influences personnel management (Belardinelli et al., 2018) and organizational policymaking (Bellé, Cantarelli, & Belardinelli, 2018), and how a consider-the-opposite debiasing intervention could be effective in mitigating attribute framing bias in public administration decision-making. Attribute framing bias was therefore included in this study to replicate the propensity measurement (i.e., per cent likelihood) utilized in prior experimental studies that evaluated how the bias influences decisions in domains of personnel management and organizational policymaking, and to replicate experimental evaluation of a consider-the-opposite debiasing intervention to determine whether this approach could be generalized to improve decision-making in public education administration.

Attribute Framing Decision Scenarios and Control Groups Hypothesis

To measure attribute framing bias and the influence of a consider-the-opposite debiasing intervention, study participants were split into four groups: (1) positive framing control group, (2) positive framing intervention group, (3) negative framing control group, and (4) negative framing intervention group. Each group of participants was given three decision scenarios in which the presentation of data was framed either positively or negatively, with the intention to prime study participants' responses toward a higher or lower propensity (e.g., per cent likelihood) to support the given policy option. To evaluate the debiasing intervention, participants in the intervention groups were asked to explicitly *consider the opposite* in response to the prompt: *Provide two reasons why others might challenge your decision.* Study participants were then required to type two such responses to this prompt. Precise data measurement design for the attribute framing bias experiments is discussed in the *Data and Methods* chapter. Exact attribute framing bias decision scenario content is presented in Appendix G: Survey-in-the-Field (Quantitative Data Collection Instrument).

Attribute Framing Bias Decision Scenario #1

In the first attribute framing bias decision scenario, study participants were asked to consider supporting a curricular policy that would reduce 3rd-grade class sizes to a 16:1 student-teacher ratio based on research evidence. The positive framing decision scenario included a biasing statement indicating that **4 of 6** members of the curriculum and instruction committee **agree** with the policy change. The negative framing decision scenario included a biasing statement indicating that **2 of 6 members** of the curriculum and instruction committee **disagree** with the policy change. Study participants indicated a per cent likelihood response using a 0-100 scale. The attribute framing statements were skewed positive—4 of 6 agree vs. 2 of 6 disagree, rather than 3 of 6 agree vs. 3 of 6 disagree— in order to offset the potential for negative framing bias, which has been shown to elicit a stronger reaction to negative information than to logically equivalent positive information (Cheng et al., 2014).

Attribute Framing Bias Decision Scenario #2

In the second attribute framing bias decision scenario, study participants were asked to consider supporting a policy that would require cafeteria workers to serve cheaper meals to students whose families have outstanding meal debt, as a remedy for $150,000 in student meal program losses over the past three years. The positive framing decision scenario included a biasing statement indicating that **6 of 9** school board members **agree** with the policy change. The negative framing decision scenario included a statement indicating that **3 of 9** school board members **disagree** with the policy change. Study participants indicated a percent likelihood response using a 0-100 scale. The attribute framing statements were skewed positive—6 of 9 agree vs. 3 of 9 disagree, rather than 5 of 9 agree vs. 4 of 9 disagree— in order to offset the

potential for negative framing bias, which has been shown to elicit a stronger reaction to negative information than to logically equivalent positive information (Cheng et al., 2014).

Attribute Framing Bias Decision Scenario #3

In the third attribute framing bias decision scenario, participants were asked to consider supporting a policy that would eliminate the music programs in response to district budget cuts enacted by the governor. The positive framing decision scenario included a statement indicating that **72%** of stakeholders **agree** with the policy change. The negative framing decision scenario included a statement indicating that **28%** of stakeholders **disagree** with the policy change. Study participants indicated a percent likelihood response using a 0-100 scale. The attribute framing statements were skewed positive—72% agree vs. 28% disagree, rather than 50% agree vs. 50% disagree—in order to offset the potential for negativity bias, which has been shown to elicit a stronger reaction to negative information than to logically equivalent positive information (Cheng et al., 2014).

H4: The positive framing bias control group will indicate a significantly higher mean propensity to select the given decision option than will the negative framing bias control group.

Nudging as Cognitive Bias Mitigation in Behavioral Public Administration

Behavioral public human resource theory is apt in synthesizing the aforementioned theories in experimental evaluation of debiasing interventions (Battaglio et al., 2018). This theory applies principles of nudge theory to mitigate cognitive bias in decision domains of personnel management and organizational policymaking (Cantarelli et al., 2020). Nudge theory asserts that nudging of decisions—e.g., by eliciting deliberate reflection—can guide improved decision-making, which in practice entails a nudge that *both* aids a better-informed decision *and*

preserves the decision-maker's agency in making such decisions (Battaglio et al., 2018; Sunstein, 2016; Thaler & Sunstein, 2003; Thaler & Sunstein as cited in Dudley & Xie, 2019).

Nudging is hypothesized as a debiasing intervention that elicits either: (1) *System 1* cognitive processing, which is automatic and usually unconscious for the decision-maker; or (2) *System 2* cognitive processing, which is deliberate and conscious for the decision-maker (Sunstein, 2016; Sunstein & Thaler, 2003; Thaler & Sunstein, as cited in Cantarelli et al., 2020). An example of *System 1* nudging is promotion of healthful food selection by prominently displaying fruits and vegetables as buffet choices. An example of *System 2* nudging for the same purpose is displaying nutrition facts next to all buffet choices. The *System 1* nudging intervention would likely go unnoticed by buffet patrons, whereas the *System 2* nudging intervention would raise the consciousness of buffet patrons.

When it comes to debiasing interventions in the behavioral economics and behavioral public administration literatures, nudges have been experimentally evidenced to mitigate or eliminate the bounded rationality or cognitive bias that adversely influences individual decision-making (Cantarelli et al., 2020; Congdon et al., 2011). The mitigating influence of nudging has been demonstrated, for instance, in cases of economic welfare enhancement by encouraging employees to commit to depositing future pay raise additions into a retirement account (Congdon et al., 2011; Kahneman et al., 2021; Thaler & Benartzi, 2004); and of social equity by increasing the diversity of a police force by nudging racial minority candidates to participate in and succeed on entrance assessments (Linos, Reinhard, & Ruda, 2017).

Behavioral public administration theory asserts that principles of nudge theory can be applied to public personnel and organizational policymaking, meaning that public-sector decision-makers ought to be empowered to make choices not only in their own best interest, but

especially in the best interest *of others* (Cantarelli et al., 2020; Dudley & Xie, 2019). This approach to improving public-sector decision-making answers Herbert Simon's (1946, 1947) call for applying evidence from behavioral science to improve public administration practice. That is, public administrators and public employees should be trained to make unbiased decisions in highly complex environments, rather than be expected to conform to idealistic decision-making models that assume decision-makers are omniscient and utility-maximizing in all cases (Battaglio et al., 2018; Cantarelli et al., 2020; Dudley & Xie, 2019).

Consider-the-Opposite Debiasing Strategy as Ex Post Intervention

The consider-the-opposite debiasing intervention was coined and first evaluated in a social psychology experiment by Lord and colleagues (1994). The researchers found this intervention not only effective in mitigating participants' social biases (e.g., prejudices), but also more effective than simply asking participants to remain unbiased in their social judgments (Lord et al., 1994). In experiments like this, the crucial difference between a consider-the-opposite intervention and an instructive warning intervention is that when study participants are asked to consider the opposite of information presented to them, they are forced to explicitly acknowledge counterfactual information that can offset the influence of cognitive bias. Although debiasing interventions like instructive warnings (e.g., informing participants about the bias) have been found effective experimentally, most evidence suggests that the debiasing effectiveness of such strategies is mixed or non-existent (Adame, 2015; Cantarelli et al., 2020; Furnham & Boo, 2011; Wilson & Brekke, 1994). This is because instructive warning-type interventions do not always elicit the effortful *System 2* cognitive processing that can enable decision-makers to overcome immediate *System 1* cognitive processing (Cantarelli et al., 2020; Crosskery et al., 2013b; Sunstein, 2016). This may also result from an inadequate incentive for the decision-maker—e.g.,

lacking motivation to deliberate—who reverts to ingrained habits of intuitive, irrational judgment in the face of contradictory evidence (Arkes, 1991; Wilson & Brekke, 1994).

To mitigate the adverse priming influences of anchoring bias and attribute framing bias, a consider-the-opposite debiasing intervention is hypothesized as a *System 2* nudge, that is, a means to elicit conscious deliberation in decision-making (Battaglio et al., 2018; Dudley & Xie, 2019; Sunstein, 2016). Specifically, this debiasing intervention aims to modify the individual decision-maker (Adame, 2015; Battaglio et al., 2018; Nagtegaal et al., 2020) by eliciting effortful *System 2* deliberation to mitigate immediate *System 1* reflexivity (Arkes, 1991; Battaglio et al., 2018; Kahneman, 2003; Sunstein, 2016). Such after-the-fact debiasing strategies are a type of *ex post* intervention, which raises the consciousness of a decision-maker after information has been presented, and which prompts the decision-maker to deliberate using *System 2* cognitive processing (Kahneman et al., 2021). A consider-the-opposite debiasing intervention is useful in cases where the decision-maker is faced with a complex, consequential decision for which feedback and sufficient information are not readily available, as for decisions made under conditions of uncertainty and time pressure (Arkes, 1991; Nagtegaal et al., 2020).

In addition, a consider-the-opposite debiasing intervention follows Dudley and Xie's (2019) hypothesis that soliciting alternative perspectives early in the decision-making process can mitigate cognitive biases for public administrators. This early engagement with other perspectives can offset the temptation to make decisions in isolation due to myopic thinking, or to make decisions reinforced by salient environmental cues that lead to accessibility bias, e.g., anchoring bias. Consider-the-opposite is also called a forcing type of debiasing intervention, as decision-makers must take a *metacognitive step* to explicitly acknowledge alternatives to their initial, intuitive judgments (Crosskery et al., 2013b). This conception of debiasing mitigation fits

the intent of intervening after the decision-maker has begun to formulate a response. Extending this line of reasoning, if individual decision-makers develop a habitual *consider-the-opposite* approach to decision-making, the effect could mimic collaborative decision-making environments in which people are encouraged to be skeptical and debate alternative viewpoints, thereby offsetting an individual decision-maker's cognitively biased judgment (Crosskery et al., 2013b; Roberto, 2009a). Practical debiasing strategies which manifest an *ex post* consider-the-opposite debiasing intervention: staying open to new data; seeking disaffirming evidence; suggesting the null hypothesis; and, proverbially, playing the devil's advocate (Roberto, 2009b).

Consider-the-Opposite Debiasing Intervention for Anchoring Bias

A consider-the-opposite debiasing intervention has been experimentally tested and found moderately to significantly effective in multiple studies of anchoring bias in decision-making in public administration (Nagtegaal et al., 2020) and other disciplines like medicine, clinical psychology, and social psychology (Adame, 2015; Hirt & Markman, 1995; Mumma & Wilson, 1995; Mussweiler et al., 2000). For this dissertation research study, in the anchoring bias decision scenarios, a consider-the-opposite debiasing strategy served as an *ex post* intervention that prompted study participants to explicitly cite two reasons why others might challenge their decision. This intervention strategy partially replicated the work of Nagtegaal and colleagues (2020), whose experiments evaluated the effectiveness of a similar consider-the-opposite strategy to mitigate anchoring bias in personnel management and organizational policymaking decision domains. However, in the partially replicated study, the consider-the-opposite strategy entailed eliciting two reasons why the low or high anchor value was inappropriate (Nagtegaal et al., 2020).

The influences of low anchoring bias and high anchoring bias were hypothesized to prime a decision-maker toward making estimates that are, respectively, lower or higher than a plausible estimate (Kahneman, 2011). To counter the anchoring influence, a consider-the-opposite debiasing intervention prompted decision-makers to overcome reflexive suggestibility by having to explicitly confront this tendency (Adame, 2015; Croskerry et al., 2013b). For this dissertation study, participants in the intervention groups for low anchoring bias and high anchoring bias were prompted to type two *consider-the-opposite* statements in two separate text boxes prior to indicating a quantitative response to the decision scenario. Precise research design variables and measurements are discussed in the *Data and Methods* chapter.

Debiasing Anchoring Bias Hypotheses

H2a: The high anchoring bias control group will indicate a significantly higher mean response than will the high anchoring bias intervention group.

H2b: The low anchoring bias control group will indicate a significantly lower mean response than will the low anchoring bias intervention group.

Consider-the-Opposite Debiasing Intervention for Attribute Framing Bias

A consider-the-opposite debiasing intervention strategy has been experimentally tested and found moderately or significantly effective in behavioral science studies of attribute framing bias in decision-making (Cheng et al., 2014; Seta et al., 2019). For this dissertation research study, in the framing bias decision scenarios, the consider-the-opposite debiasing strategy served as an *ex post* intervention that prompted respondents to explicitly cite two reasons why others would challenge their decision (e.g., contrary reasons). The influence of attribute framing bias was hypothesized to prime a decision-maker toward the propensity to accept or reject the given policy option according to, respectively, its positive or negative valence framing (Kahneman,

2011; Seta et al., 2019), whereas the consider-the-opposite debiasing intervention prompted decision-makers to overcome their immediate judgment by having to explicitly confront this tendency (Croskerry et al., 2013b). This strategy partially replicated the work of Cheng and colleagues (2014), whose experiments evaluated the effectiveness of a consider-the-opposite intervention strategy to mitigate consumers' attribute framing bias elicited by advertising claims. Participants in the intervention groups for positive framing bias and negative framing bias were prompted to type two *consider-the-opposite* statements in two separate text boxes prior to indicating a response to the decision scenario. Precise research design variables and measurements are discussed in the *Data and Methods* chapter.

Debiasing Attribute Framing Bias Hypotheses

H5a: The positive framing bias control group will indicate a significantly higher mean propensity to select the given decision option than will the positive framing bias intervention group.

H5b: The negative framing bias control group will indicate a significantly lower mean propensity to select the given decision option than will the negative framing bias intervention group.

Literature Review Summary

This study aims to close the literature gap in experimental studies on cognitive bias and debiasing in the public administration field. The study addressed *both* the long-ago call from eminent scholar, Herbert Simon, to conduct experimental research on decision-making in the field, *and* the recent call from public administration researchers to test the empirical generalizability of theories on cognitive bias and debiasing (Battaglio et al., 2018). Importantly, the literature review exposed a wide gap in the K-12 public education sector, in which

experimental research on cognitive bias in administrator decision-making has been sparse with only five known published studies (Battaglio et al., 2018). To address this gap, a mixed-methods design was devised aiming to answer Simon's (1946, 1947) call for observing the decision-making behavior of public administrators in the context in which they operate.

How the Literature Informed the Research Design

Five seminal theoretical frameworks for explaining how humans *actually* make decisions have undergirded this dissertation study. These interrelated frameworks are, in historical order: bounded rationality theory, prospect theory, behavioral economics theory, and nudge theory. Each theory contributed to the dissertation research goal of solving a public problem: the adverse influence of cognitive bias in public administrator decision-making. Behavioral public administration theory bridges these seminal theories to integrate behavioral science and public administration on the individual level of analysis (Grimmelikhuijsen et al., 2016).

Utilizing behavioral public administration as a theory-to-practice framework, a mixed-methods design was emplyed, wherein the first-stage qualitative study results informed the contextual basis for the second-stage quantitative study. In order to create decision scenarios germane to participants in the second-stage quantitative study, a qualitative study was first conducted. In the first-stage qualitative study, participants were asked to provide written text data about decision-making in their role(s) as K-12 public education administrators, in answer to two overarching research questions: *What types of decisions do K-12 public education administrators make in the domain of* ***personnel management?*** and *What types of decisions do K-12 public education administrators make in the domain of* ***organizational policymaking****?* Given the answers to these qualitative research questions, six decision scenarios were devised to target the real-world decision domains of currently practicing K-12 public education administrators.

Quantitative data were then utilized to answer two overarching research questions for the second-stage quantitative study: *Do **anchoring bias or attribute framing bias** influence the decision-making of K-12 public education administrators? Does a consider-the-opposite debiasing intervention mitigate the influences of **anchoring bias or attribute framing bias** in the decision-making of K-12 public education administrators?*

Chapter III: Data and Methods

Methodology Overview

This dissertation research study employed a mixed-method, cross-sectional, quasi-experimental research design. The first-stage study entailed a qualitative study to collect, analyze, and collate subjective text data from retired K-12 public education administrators. An online structured written interview questionnaire was utilized to elicit open-ended text data about types and examples of decisions these retired administrators had made as school district superintendents and school principals in decision domains of personnel management and organizational policymaking. Analysis of the qualitative data aided content formulation of a survey-in-the-field data collection instrument utilized in the second-stage quantitative research study. In the quantitative research study, the main purpose was to collect and analyze numerical data and subjective text data to: (1) observe the influences of attribute framing bias and anchoring bias on decision-making of K-12 public education administrators in decision domains of personnel management and organizational policymaking; and (2) evaluate the effectiveness of a consider-the-opposite debiasing intervention in mitigating the influences of attribute framing bias and anchoring bias on these administrators' decision-making.

In one half of the quantitative study, there was one independent variable (anchoring bias influence); one dependent variable (participant responses to anchoring bias decision scenarios); and one interventional variable (a consider-the-opposite debiasing intervention for anchoring bias). In the other half of the quantitative study, there was one independent variable (attribute framing bias influence); one dependent variable (participant responses to attribute framing decision scenarios); and one interventional variable (a consider-the-opposite debiasing intervention for attribute framing bias). For both anchoring bias and attribute framing bias

intervention groups, the quality of consider-the-opposite debiasing feedback was evaluated for its quality and relationship to debiasing mitigation.

Data and Methods Chapter Organization

This chapter is organized according to the following two subchapters: *Qualitative Methodology Subchapter* and *Quantitative Methodology Subchapter*. The content of each subchapter includes discussion of the research questions; phenomenon operationalization for the qualitative study; and hypotheses and variable operationalization for the quantitative study. In the *Research Design* sections, each design is described and justified as a suitable method to address the research questions and resolve the hypotheses in the context of the methodology literature. In the *Research Context* sections, these contexts are described and justified in reference to the literature review. In the *Research Sample* sections, data sources and sampling procedures are explained and justified. Size and characteristics of the research sample are also discussed. In the *Research Integrity* sections, described are the steps taken to uphold the ethical integrity of the research process, research participants' rights, and the Institutional Review Board process. In the *Data Collection* and *Instruments and Procedures* sections, data collection methods are described and justified. For the quantitative study sub-chapter, the statistical models utilized to analyze the data are justified, as are the measures taken to uphold research validity. In the *Role of the Researcher* section, the researcher's role for the entire study is explained, along with biases, beliefs, and assumptions on the researcher's part. In the *Summary* section, key points of the *Data and Methods* chapter are summarized.

Qualitative Methodology Subchapter

Research Questions

The following outline delineates the research questions for the first-stage qualitative study. In the qualitative study, research questions centered on the types of decisions that K-12 public education administrators—school district superintendents and school principals—make in decision domains of personnel management and organizational policymaking. These questions elicited from study participants open-ended text data that was analyzed qualitatively and employed to inform the content of a survey-in-the-field instrument utilized to collect data in the quantitative study which followed.

RQ1: What types of decisions do K-12 public education administrators make in the domain of **personnel management?**

RQ1a: In the domain of personnel management, what specific types of decisions do K-12 public education administrators make about people in **hiring?**

RQ1b: In the domain of personnel management, what specific types of decisions do K-12 public education administrators make about people in **evaluations?**

RQ1c: In the domain of personnel management, what specific types of decisions do K-12 public education administrators make about people in **disciplinary action?**

RQ1d: In the domain of personnel management, what specific types of decisions do K-12 public education administrators make **apart from those mentioned above?**

RQ2: What types of decisions K-12 public education administrators make in the domain of **organizational policymaking?**

RQ2a: In the domain of organizational policymaking, what specific types of decisions do K-12 public education administrators make about **personnel policies**?

RQ2b: In the domain of organizational policymaking, what specific types of decisions do public education administrators make about **student policies**?

RQ2c: In the domain of organizational policymaking, what specific types of decisions do K-12 public education administrators make about **curricular policies?**

RQ2d: In the domain of organizational policymaking, what specific types of decisions do K-12 public education administrators make about **budgeting (de facto policymaking)?**

RQ2e: In the domain of organizational policymaking, what specific types of decisions do K-12 public education administrators make **apart from those mentioned above?**

Phenomenon Operationalization

Decision-making behavior was the core phenomenon explored in the qualitative study. Like all public administrators, K-12 public education administrators—school district superintendents and school principals—make decisions in domains of personnel management and organizational policymaking. The context in which public administrators make such decisions, however, is expected to vary from sector to sector. Where prior experimental research on cognitive bias in public administrator decision-making is concerned, certain studies were designed with the sample population specifically in mind (Battaglio et al., 2018). However, other experimental studies employed data collection instruments that presented decision scenarios which were irrelevant to or too broad for the sample population, thus creating a mismatch between the questions asked and the practical knowledge of study participants who answered those questions (Bellé et al., 2017; Cantarelli et al., 2020; Nagtegaal et al., 2020).

This qualitative research study, therefore, utilized a qualitative structured written interview questionnaire, which served to collect open-ended text data from retired K-12 public

education administrators about the types of decisions they made as administrators. The main purpose was to collect and analyze this qualitative data in order to discern what specific types of decisions these administrators made in domains of personnel management and organizational policymaking, and in what context such decisions were made, that is whether in isolation or a collaborative setting. As the dissertation literature review revealed, when individuals make decisions in isolation, there is a greater tendency to rely on mental shortcuts such as cognitive biases, whereas decisions made in a collaborative setting are less prone to errors caused by underlying cognitive biases.

Research Design

In research on abstract constructs like cognitive bias, it is logical to start with experimental studies that can establish a meaningful degree of internal validity, and that provide a basis for replication to evaluate construct validity and, eventually, to establish empirical generalizability (Nagtegaal et al., 2020; Walker et al., 2017). Likewise, utilizing a broad, heterogeneous study sample may be useful and warranted in the beginning stages of analyzing relationships between variables (Battaglio et al., 2018). However, given the typically generalized or cross-sector study samples in recent behavioral public administration experimental research on cognitive bias and debiasing interventions (Battaglio et al., 2018), there is justification to now conduct survey-in-the-field experiments which target a specific, localized public sector (Cantarelli et al., 2020). Hence, for this dissertation research study, in order to tailor the quantitative survey-in-the-field data collection instrument to the target sample of current K-12 public education administrators in Pennsylvania, the researcher first conducted a qualitative study of retired K-12 public education administrators, all but one who had practiced in Pennsylvania. In short, open-ended qualitative data were collected and analyzed to then inform

the quantitative data collection instrument and, thus, to increase its internal validity and face validity.

Behavioral Public Administration Research Context

According to behavioral public administration theory, integrating behavioral science and public administration on the individual level of analysis has pragmatic value for the field (Grimmelikhuijsen et al., 2016). Looking to the early behaviorists in our discipline, Simon (1946; 1956) called for melding behavioral science with public administration, urging scholars to use positivist research methods but to recognize the individual variability in thinking and behavior, and to view decision-making as *satisficing* (i.e., making a *good enough* decision) given persistent constraints on time and information (Battaglio et al., 2018; Grimmelikhuijsen et al., 2016; Iwasa & de Almeida, 2021; Simon as cited in Riccucci, 2010; Riccucci, 2010). Simon's concept of bounded rationality is relevant to the political domain in which decision-making depends on pluralism, power relations, and value-based motivation, in addition to cognitive factors (Forrester, 1984; Simon, 1985). Furthermore, to understand how political actors reason and behave, researchers should explore a political context according to the subjective experiences of its actors, rather than generalize about behavior in all contexts (Simon, 1985; Simon as cited in Riccucci, 2010).

Mixed Method Research Design Rationale

Although numerous decision-makers participate in the dynamic inner workings of the K-12 public education sector, the influence of cognitive bias on administrators is worthy of study on the individual level of analysis. Moreover, since there is no single administrator typology that applies to all public administration contexts, researchers should study particular contexts in which administrators operate and make decisions (Denhardt, Denhardt, & Blanc, 2012). To

uncover and observe K-12 public education administrators' decision-making behavior, this dissertation research study employed a qual-QUAN sequential mixed methods design (Morse & Niehaus, 2009). This mixed methods research design mirrors the practice of public administration—both an art and a science (Riccucci, 2010), which are rarely, if ever, mutually exclusive.

Qualitative Research Design Rationale

In the qualitative study, the researcher inductively explored the professional experiences of former K-12 public education administrators to understand the types of decisions they made in domains of personnel management and organizational policymaking. These study participants were asked questions specifically about aspects of personnel management (e.g., hiring, discipline, etc.) and organizational policymaking (e.g, student, curricular, etc.). The results of the qualitative data analysis served to develop six decision scenarios that were utilized in the survey-in-the-field data collection instrument for the quantitative study that would follow. These decision scenarios were consciously crafted with the qualitative study results in mind, such that survey-in-the-field content would be both germane to these administrators' everyday decisions and framed in a realistic K-12 public education decision-making context.

Qualitative Methodological Framework vis-á-vis the Research Questions

In the qualitative research study, the overarching research question was two-fold: What types of decisions do K-12 public education administrators make in domains of (1) personnel management and (2) organizational policymaking? To address this question, the qualitative research study employed inductive methods to explore the phenomenon of decision-making behavior of retired K-12 public education administrators. The purposive sample of participants were interviewed through an online questionnaire that elicited nuanced open-ended

responses. At this research stage, an inductive line of inquiry undergirded by an interpretive paradigm was well suited to answer the research questions, which required analytical investigation of the subjective experiences of these administrators, for which no hypothesis was formulated (Hesse-Biber, 2017).

An interpretivist researcher holds the ontological view that social phenomena are infinitely varied, and that truth is as pluralistic as the individuals who experience the phenomena (Hesse-Biber, 2017). This qualitative approach, therefore, suited the research purpose of exploring the types of decisions that K-12 public education administrators made in the aforementioned decision domains, as well as external factors, such as political or institutional influences, that influenced the individual's decision-making context (Creswell & Poth, 2018). The dissertation researcher approached the open-ended interviews as a co-participant in the research process (Collins & Cooper, 2014), with a view to discovering a pattern of subjective experiences related by the former administrators, as gleaned from the nuanced text data provided in their interview responses (Bazeley, 2021; Hesse-Biber, 2017).

Research Context

As discussed in the *Literature Review*, experimental studies of cognitive bias and debiasing interventions were conducted relatively recently in the behavioral public administration literature. Furthermore, experimental studies of cognitive bias in decision-making are sparse in the K-12 public education sector in the United States with only five known published studies in the literature, while no known published experimental study has evaluated a debiasing intervention in this sector (Battaglio et al., 2018). Meanwhile, behavioral public administration researchers have called for replication studies of such experimental studies on cognitive bias to evaluate the empirical generalizability of results across institutional and sector

settings (Battaglio et al., 2018; Bellé et al., 2017; Bellé, Cantarelli, & Belardinelli, 2018; Nagtegaal et al., 2020). This dissertation research study, therefore, employed a mixed-method, quasi-experimental design aimed at observing and attempting to mitigate cognitive bias in decision-making among K-12 public education administrators within a localized but populous region (Pennsylvania) in the United States.

The K-12 public education sector in Pennsylvania was selected as the research context for several reasons. First, the dissertation researcher has worked in public and private educational settings in Pennsylvania. Second, no known published experimental study on cognitive bias has been conducted with a sample of K-12 public education administrators in the state. Finally, Pennsylvania is a diverse, populous state that hosts 504 school districts, providing a varied cross-section of small, medium, and large school districts within town, rural, urban, and suburban regions. Specifically, the regional classification breakdown of school districts is: 35 town, 90 urban, 188 suburban, and 191 rural (Pennsylvania Department of Education, 2020).

For the qualitative study, the research setting itself was an online interface utilizing email and Qualtrics survey software to transmit the data collection instrument to research participants. Prospective study participants were contacted by email with a study invitation message and a link to a Qualtrics electronic survey form that contained the informed consent statement (Appendix B) and the interview questionnaire (Appendix C). These participants could have completed the survey-in-the-field anywhere, since the retired K-12 public education administrators were emailed at their personal email addresses. Study participants' Internet Protocol addresses were intentionally not tracked in Qualtrics to ensure anonymity of participants, and because these data were not relevant to the research study.

Research Sample, Data Sources, and Sampling Procedure

In the qualitative study, the researcher employed a purposive, convenience sampling of 12 retired K-12 public school district superintendents and school principals, almost all of whom held multiple different positions which were targeted in the quantitative study. A sample of 12 participants in an in-depth qualitative interview format was considered adequate to provide rich data (Hesse-Biber, 2017; Creswell & Poth, 2018). Eleven of the 12 retired administrators had practiced in Pennsylvania, whereas one had practiced in New Jersey. Qualitative study participants were intentionally selected from the researcher's personal and professional networks.

For this first-stage study, a purposive sampling was appropriate given the inductive research purpose and the delimited scope of phenomenological exploration of decision-making by these K-12 public education administrators, as a direct link to the quantitative sampling of currently practicing school district superintendents and school principals in Pennsylvania. A convenience sampling was appropriate given that retired K-12 public education administrators would be difficult to recruit randomly, and that qualitative study participants would be asked to spend significant time responding to open-ended, structured written interview questions. The qualitative text data were analyzed and utilized to inform the content and context of the survey-in-the-field instrument for the second-stage quantitative study. Qualitative study participants were recruited by direct email from the researcher. A Qualtrics survey URL link was provided in an invitation email following a brief message to inform potential participants about the study purpose and to invite them to participate by clicking the survey link (Appendix A).

Research Integrity

Institutional Review Board Process

The researcher gained approval from the Institutional Review Board (IRB) to conduct the qualitative research study in October 2021. During the IRB process, ethical considerations were demonstrated and reviewed, such as potential risks of harm to study participants, how prospective participants would be informed and enabled to give consent to participate, and how the data collected would be kept confidential by the researcher. The IRB also reviewed the merits of the research study purpose, research design, and proposed data analytic techniques.

Participant Risks and Benefits

Minimal to no risks to qualitative study participants were anticipated. Although there were no direct benefits to study participants, the participants may have gained some knowledge of cognitive bias as explained in the study debriefing message (Appendix D). Overall dissertation study results are expected to contribute to the public administration literature, and the qualitative research design may serve as a model for research replication.

Any risk to study participants, albeit minimal, may have related to the partial non-disclosure employed in the data collection method. It was necessary, however, to limit participant knowledge of the research topic to allow the open-ended interview procedure to proceed without participant bias. Upon debriefing, participants were fully informed of the qualitative study purpose and the eventual quantitative study purpose, which should have assured participants of the need for partial non-disclosure in the research design (Appendix D).

Participant Confidentiality

Qualitative study participants' identities were known to the researcher, given the personal, one-to-one email recruitment procedure. No study questions elicited any personally

identifying information. Published study results pertain only to generic participant information that is not connected to participants' identities. Qualitative study data has been kept on the researcher's password-protected computer using password-protected software: Qualtrics and Microsoft One Drive. Only the researcher and the researcher's dissertation advisor have access to the data. Data will be retained for a minimum of three years after the date of dissertation publication per federal guidelines.

Informed Consent

In the qualitative study, participants were provided with an electronic informed consent statement (Appendix B) on the initial screen of their respective Qualtrics interview questionnaire. Participants were instructed to indicate their consent to participate in the study by clicking the arrow ("next") button at the bottom of that initial screen, which then launched the beginning screen of the interview questionnaire.

Data Collection

Data Collection Methods and Procedures

For the qualitative study, Qualtrics survey software was utilized to facilitate an asynchronous online data collection interface between the researcher and prospective study participants. Qualtrics software enables creation of a URL link to online surveys, which was distributed by email to prospective research participants. The URL link to the Interview Questionnaire was distributed by the researcher individually to the personal email addresses of prospective study participants. The email first greeted and invited prospective participants to join the study. Once participants opened the survey by clicking the survey link embedded in the email, participants were shown the Informed Consent Statement (Appendix B) on the initial screen. To demonstrate acceptance of the Informed Consent Statement, participants were

instructed to click the right-arrow (next) button to proceed to the survey. The Interview Questionnaire contained nine open-ended questions that elicited feedback about various types and examples of decisions that the participants--now retired K-12 public education administrators—had made in domains of personnel management and organizational policymaking (See Appendix C).

Data Collection Period

Qualitative data collection took place from October to November 2021. Once the first-stage qualitative study was complete, the researcher submitted an application for the second-stage quantitative study to the Institutional Review Board (IRB). The quantitative study received IRB approval in late November, as planned before the Fall 2021 semester ended, so that quantitative data collection could commence during the Spring 2022 semester.

Data Analysis Justification

Qualitative data analysis entailed a phenomenological case study approach that centered on decision-making by K-12 public school district superintendents and school principals. The purposive sample of 12 retired administrators were asked to provide types and examples of decisions they made in personnel management and organizational policymaking domains. Within these overarching decision domains, the structured interview questionnaire focused study participant responses on specific sub-domains. Within each decision sub-domain (e.g., hiring or curricular policymaking), attention was paid especially to the context of these decisions, for eventual inclusion of the content and context in decision scenarios in the second-stage quantitative study.

Qualitative study participant responses for each decision sub-domain were coded as *collaborative*, *policy oriented*, or *in isolation* and tallied for frequency of mention across all

participants. Based on the total number of times the decision-making context was mentioned, a final code was assigned to the decision sub-domain. For example, for hiring decisions, all participants mentioned a collaborative approach which occurred 17 times total, but they never mentioned decisions made in isolation. Hence, a final code of *Highly Collaborative* was assigned to the hiring decision sub-domain. For each decision sub-domain, a data table displays raw data including excerpts or paraphrases from participant responses, along with the frequency of mention across all participant responses. Final codes include: *Highly Collaborative, Moderately Policy Oriented, Somewhat Policy Oriented,* and *Highly Isolated*.

Quantitative Methodology Subchapter

Research Questions and Hypotheses

The following outline delineates the research questions and hypotheses for the second-stage quantitative study. These research questions and/or hypotheses are subsequently discussed in relation to variable operationalization and the quantitative research design.

In the quantitative study, research questions and hypotheses centered on four aspects of cognitive bias in decision-making: (1) the influences of anchoring bias and attribute framing bias on decision-making, as observed in the control groups; (2) the effectiveness of a consider-the-opposite debiasing intervention in mitigating anchoring bias and attribute framing bias, as observed between the control groups and intervention groups; (3) the quality of consider-the-opposite feedback and its relationship to debiasing mitigation, as observed in the intervention groups; and (4) potentially confounding variables related to study participant characteristics—age, education level, years in current position, total years in public education administration positions, and school district size—held constant as covariates in the quantitative data analysis (multiple regression model) if found statistically significant between groups.

Research Question 1 and Hypothesis 1

RQ1: Does anchoring bias influence the decision-making of K-12 public education administrators in personnel management and organizational policymaking?

H1: The high anchoring bias control group will indicate a significantly higher mean response to each anchoring bias decision scenario than will the low anchoring bias control group.

Research Question 2 and Hypotheses 2a and 2b

RQ2: Does a consider-the-opposite debiasing intervention mitigate the influence of anchoring bias in decision-making of K-12 public education administrators in personnel management and organizational policymaking?

H2a: The high anchoring bias control group will indicate a significantly higher mean response to each anchoring bias decision scenario than will the high anchoring bias intervention group.

H2b: The low anchoring bias control group will indicate a significantly lower mean response to each anchoring bias decision scenario than will the low anchoring bias intervention group.

Research Question 3 and Hypotheses 3a and 3b

RQ3: Does the quality of consider-the-opposite feedback influence the effectiveness of the consider-the-opposite debiasing intervention in mitigating the influence of anchoring bias?

H3a: Consider-the-opposite feedback quality will significantly influence the debiasing mitigation of high anchoring bias influence. There will be an inverse linear

relationship between the intervention group's total feedback quality rating and responses to high anchoring bias decision scenarios. (i.e., the higher the feedback quality, the lower the responses.)

H3b: Consider-the-opposite feedback quality will significantly influence the debiasing mitigation of low anchoring bias influence. There will be a direct linear relationship between the intervention group's total feedback quality rating and responses to low anchoring bias decision scenarios. (i.e., the higher the feedback quality, the higher the responses.)

Research Question 4 and Hypotheses 4a and 4b

RQ4: Does attribute framing bias influence the decision-making of K-12 public education administrators in organizational policymaking?

H4: The positive framing bias control group will indicate a significantly higher mean propensity to select the given decision option than will the negative framing bias control group.

Research Question 5 and Hypotheses 5a and 5b

RQ5: Does a consider-the-opposite debiasing intervention mitigate the influence of attribute framing bias in decision-making of K-12 public education administrators in organizational policymaking?

H5a: The positive framing bias control group will indicate a significantly higher mean propensity to select the given decision option than will the positive framing bias intervention group.

H5b: The negative framing bias control group will indicate a significantly lower mean propensity to select the given decision option than will the negative framing bias

intervention group.

Research Question 6 and Hypotheses 6a and 6b

RQ6: Does the quality of consider-the-opposite feedback influence the effectiveness of the consider-the-opposite debiasing intervention in mitigating the influence of attribute framing bias?

H6a: Consider-the-opposite feedback quality will significantly influence the debiasing mitigation of positive framing bias influence. There will be an inverse linear relationship between the intervention group's total feedback quality rating and responses to positive framing bias decision scenarios. (i.e., the higher the feedback quality, the lower the responses.)

H6b: Consider-the-opposite feedback quality will significantly influence the debiasing mitigation of negative framing bias influence. There will be a direct linear relationship between the intervention group's total feedback quality rating and responses to negative framing bias decision scenarios. (i.e., the higher the feedback quality, the higher the responses.)

Variable Operationalization

In one half of the quantitative research study, there were three anchoring bias decision scenarios presented to control group and intervention group participants in their respective survey-in-the-field versions. Control group participants were given a survey-in-the-field containing all six decision scenarios—three for anchoring bias and, as described below, three for attribute framing bias. By contrast, the intervention group participants were partitioned into two separate groups—anchoring bias intervention group and attribute framing bias intervention group—and each given a survey-in-the-field containing only the three decision scenarios for the

respective bias. Hence, the anchoring bias intervention group was given a survey-in-the-field containing only the three anchoring bias decision scenarios, plus they were prompted to provide consider-the-opposite feedback before answering the decision scenario question.

In each anchoring bias decision scenario, the variables included one independent variable, one interventional variable, one dependent variable, and potentially five covariates. The independent variable was either high anchoring bias influence or low anchoring bias influence, randomized within Qualtrics survey software to separate participants into two adjacent anchoring bias control groups (e.g., high and low). The interventional variable was consider-the-opposite debiasing influence. The dependent variable was the quantitative response provided by participants to the decision scenario question. The five potential covariates comprised the study participant's (1) age; (2) years in current position; (3) total years in K-12 public education administration position(s); (4) education level; and (5) school district size.

In the other half of the quantitative research study, there were three attribute framing bias decision scenarios presented to control group and intervention group participants in their respective survey-in-the-field versions. Control group participants were given a survey-in-the-field containing all six decision scenarios—three for anchoring bias as described above, and three for attribute framing bias. As described above for anchoring bias, the attribute framing intervention group was given a survey-in-the-field containing only the three anchoring bias decision scenarios, plus they were prompted to provide consider-the-opposite feedback before answering the decision scenario question.

In each attribute framing bias decision scenario, the variables included one independent variable, one interventional variable, one dependent variable, and potentially five covariates. The independent variable was either positive framing bias influence or negative framing bias

influence, randomized within Qualtrics survey software to separate participants into two adjacent attribute framing control groups (e.g., positive and negative). The interventional variable was consider-the-opposite debiasing influence. The dependent variable was the quantitative response provided by participants to the decision scenario question. The five potential covariates comprised the study participant's (1) age; (2) years in current position; (3) total years in K-12 public education administration position(s); (4) education level; and (5) school district size.

Dependent Variables

Responses to Anchoring Bias Decision Scenarios

In each of the three anchoring bias decision scenarios, study participants' *responses to decision scenarios* were the dependent variable. Study participants responded to anchoring bias decision scenarios by indicating a whole number in response to a personnel management decision scenario or an organizational policymaking decision scenario. Participant decision responses were open-ended in response to a question like: *What student-teacher ratio would you set for this policy?* This is a continuous dependent variable that quantitatively represents the influence of anchoring bias on participants' decision responses. This variable construct and measurement replicate the work of Bellé, Cantarelli, and Belardinelli (2017); Bellé and colleagues (2018); and Naagtegaal and colleagues (2020). Decision scenarios and quantitative response measurements are discussed in detail in the *Instruments and Procedures* section below.

Responses to Attribute Framing Bias Decision Scenarios

In each of the three-attribute framing bias decision scenarios, study participants' *responses to decision scenarios* were the dependent variables. Participants responded to attribute framing bias decision scenarios by indicating their propensity to follow the given course of action in an organizational policymaking decision. Propensity is measured on a 0-100 scale in

response to a question like: *How likely are you to support policy X?* This is a continuous dependent variable that quantitatively represents the influence of attribute framing bias on participants' decision responses. This variable construct and measurement replicate the work of Cantarelli, Bellé, and Belardinelli (2020). Decision scenarios and quantitative response measurements are discussed in detail in the *Instruments and Procedures* section below.

Independent Variables

Attribute Framing Bias Conceptualization

Loss aversion bias, which conceptually underlies *framing bias,* is the latent cognitive tendency to become more risk averse as the perception of potential loss increases, except in cases of probability framing (Kahneman & Tversky, 1979). In practice, loss aversion bias influences decisions about monetary or other numerical data based on *how the data is framed*, whether in negative or positive terms as in *attribute framing bias*, among other reference framing biases, as discussed in the *Prospect Theory* section of the *Literature Review* chapter (Kahneman & Tversky, 1979). Some researchers refer to attribute framing as *equivalence framing* (Fuenzalida et al., 2020), but the concept is the same: Logically equivalent data can be presented either with a positive valence or a negative valence. The consequence for decision-making is that attribute framing influences a decision-maker's likelihood to take an action due the underlying effect of loss aversion, which inhibits willingness to take a risk when the perceived likelihood of loss is higher (Kahneman & Tversky, 1981). In other words, the higher the perceived likelihood of loss, the lower the likelihood of taking action that could lead to the loss.

Attribute Framing Bias Operationalization

For this dissertation research study, the *influence of attribute framing bias* is a categorical independent variable operationalized as the cognitive tendency to make choices that reflect the

valence-frame of data presentation, whether in positive or negative terms (Fuenzalida et al., 2020; Kahneman, 2011; Tversky & Kahneman, 1990). That is, people tend to be positively primed by, and thus more receptive to, information that is framed positively. However, people tend to be negatively primed by, and thus less receptive to, information that is framed negatively. The attribute framing bias phenomenon takes hold when people fail to consider the opposite valence frame of logically equivalent data. For instance, in an attribute framing bias study on perception of human papillomavirus (HPV) vaccine effectiveness, there were two groups of participants exposed to the influence of attribute framing bias; whereas the positive framing group rated the HPV vaccine as more effective when told that the vaccine is 70% effective, the negative framing group rated the HPV vaccine as less effective when told it is 30% ineffective (Bigman, Cappella, & Hornik, 2010). Therefore, when attribute framing bias took hold, people failed to consider that a vaccine's 70% effectiveness (positive framing) is logically equivalent to its 30% ineffectiveness (negative framing).

Anchoring Bias Conceptualization

Accessibility bias, which conceptually underlies *anchoring bias*, is the latent cognitive tendency to rely on immediately available information to reduce the complexity of decision-making (Battaglio, Belardinelli, Bellé, & Cantarelli, 2018; Furnham & Boo, 2011; Kahneman, 2003; Mussweiler et al., 2000). Immediately available information may be internally or externally elicited, as primed by anchoring bias (Kahneman, 2011). Anchoring bias often involves a heuristic, or mental shortcut, called *insufficient anchor adjustment*, where a decision-maker relies on readily accessed numerical data on which to base an estimate or judgment, such as data that is salient to the decision-maker due to personal experience or environmental happenstance (Bazerman as cited in Van de Ven, 2007; Epley & Gilovich, 2006; Kahneman,

2011; Tversky & Kahneman, 1973; Tversky & Kahneman as cited in Furnham & Boo, 2011). Hence, the consequence for decision-making is that anchoring bias influences a decision-maker to indicate or estimate a numerical value that is either higher or lower than a rational estimate, even when the anchor value is arbitrary and irrelevant to the context at hand.

Anchoring Bias Operationalization

For this dissertation research study, the *influence of anchoring bias* is a categorical independent variable operationalized as the cognitive tendency to indicate or estimate a quantity that is lower (or higher) than a rationally plausible value when presented with an arbitrary too-low (or too-high) reference value (Bellé, Cantarelli, & Belardinelli, 2018; Kahneman, 2011; Nagtegaal et al., 2020; Tversky & Kahneman, 1973). In other words, even when people are primed with an arbitrary number, despite that number's distance from a plausible value or estimate, this arbitrary number serves to anchor, or skew, decision-making away from a rational choice or estimate. The anchoring bias phenomenon takes hold when people fail to consider that the anchor value is inappropriately too low or too high, and then base a decision on that too-low or too-high anchor value. For instance, if a prospective employer makes a low-ball salary offer to a job candidate, the job candidate would exhibit the influence of anchoring bias if he or she negotiates the starting salary closer to the low-ball offer than to a rational salary amount.

Confounding Variables

Age

Study participants were asked to provide a whole number indicating their current age. This was a continuous variable.

Education Level

Study participants were asked to indicate their highest level of educational attainment. Participants were provided the following options and could select only one: (1) Bachelor's Degree; (2) Some Master's Degree; (3) Master's Degree; (4) Some Doctoral Degree; or (5) Doctoral Degree. Because no participants selected Bachelor's Degree or Some Master's Degree, those categories were eliminated from the data analysis, and the remaining categories were re-coded as Master's Degree (1); Some Doctoral Degree (2); and Doctoral Degree (3). This was recoded as an ordinal variable from 1 to 3 as labeled here.

Years in Current Position

Study participants were asked to indicate the number of years they have held their current position as a school district superintendent, assistant school district superintendent, school principal, or assistant school principal, rounded up to the next year. This was a continuous variable.

Total Years in Any K-12 Public Education Administration Position

Study participants were asked to indicate the total number of years they have held any administration position in the K-12 public education sector, rounded up to the next year. This was a continuous variable.

School District Size

Study participants were asked to indicate the size of their school district's student enrollment, excluding private or charter school enrollment. Participants were provided the following six grouping options and could select only one: (1) Up to 1,000; (2) 1,001-5,000; (3) 5,001-15,000; (4) 15,001-30,000; (5) 30,001-75,000; or (6) 75,001 or more. In a one-way ANOVA analysis, these original five size groupings were later found to be less statistically

significantly different from each other, as contrasted with the following three size groupings, which were found to be more statistically significant different from each other in ANOVA modeling: (1) Up to 5,000; (2) 5,001-30,000; and (3) 30,001 or more. This was recoded as an ordinal variable from 1 to 3 as labeled here. This recoded school district size variable was utilized in Chi-Square analyses of school district size among the anchoring bias groups and among the attribute framing bias groups, to determine whether the variable would be utilized as a covariate in multiple regression analysis.

Interventional Variables

Consider-the-Opposite Debiasing Intervention for Anchoring Bias

In the anchoring bias decision scenarios, a *consider-the-opposite debiasing intervention* was a categorical interventional variable. It was hypothesized to serve as an *ex post* debiasing intervention (Kahneman et al., 2021), meaning, the intervention prompted respondents to, first, have a response in mind, then after the fact (*ex post*) to explicitly cite two reasons that others might challenge their decision. This intervention strategy partially replicated the work of Nagtegaal and colleagues (2020), whose behavioral public administration research experiments evaluated the effectiveness of a consider-the-opposite intervention to mitigate anchoring bias in public personnel management and organizational policymaking decision domains.

The influences of low anchoring bias and high anchoring bias were hypothesized to prime the decision-maker to indicate responses that were, respectively, lower or higher than a plausible numerical estimate (Kahneman, 2011). As an intervention, a consider-the-opposite debiasing strategy prompts decision-makers—i.e., by prompting *System 2* cognitive processing—to overcome the reflexive suggestibility of *System 1* cognitive processing, by having to actively confront the tendency to indicate numerical responses that are skewed toward an arbitrary too-

low or too-high anchor value (Adame, 2015; Croskerry, Singhal, & Mamede, 2013b). Delineation of the consider-the-opposite intervention for anchoring bias can be found in the *Intervention* section below.

Consider-the-Opposite Debiasing Intervention for Attribute Framing Bias

In the attribute framing bias experiments, the *consider-the-opposite debiasing intervention* is a categorical intervention variable. It is hypothesized to serve as an *ex post* debiasing intervention (Kahneman et al., 2021). Meaning, the intervention prompts respondents to, first, have a response in mind, then after the fact (*ex post*), to explicitly cite two reasons that others might challenge their decision. This intervention strategy partially replicated the work of Cheng and colleagues (2014), whose behavioral science research experiments evaluated the effectiveness of a consider-the-opposite intervention to mitigate attribute framing bias in consumer choice. Whereas Cheng and colleagues (2014) required research participants to cite four reasons why others might challenge their decision, this dissertation research study held constant the consider-the-opposite intervention across anchoring bias decision scenarios and attribute framing bias decision scenarios, by requiring all intervention group participants to cite only two reasons why others might challenge their decision.

The influences of positive framing bias and negative framing bias were hypothesized to prime a decision-maker either toward a higher propensity to accept the given course of action if it is framed positively, or toward a lower propensity to accept the given course of action if it is framed negatively (Kahneman, 2011). As an intervention, the consider-the-opposite debiasing intervention prompts decision-makers to correct themselves—i.e., by prompting *System 2* cognitive processing—to overcome the unconscious, intuitive judgment elicited by *System 1* cognitive processing, by having to actively confront the tendency to be influenced by attribute

framing bias in either direction, whether positive or negative (Seta et al., 2019). Delineation of the consider-the-opposite intervention for attribute framing bias can be found in the *Intervention* section below.

Research Design

For the overarching rationale for this mixed-method research study, please review the Quantitative Study subchapter sections: *Behavioral Public Administration Research Context* and *Mixed Method Research Design Rationale.*

Research Design Rationale

The quantitative research design aimed to deductively: (1) observe the influences of anchoring bias and attribute framing bias in K-12 public education administrator decision-making; and (2) evaluate the effectiveness of a consider-the-opposite debiasing intervention in mitigating the influences of anchoring bias and attribute framing bias in these administrators' decision-making. The quantitative study employed a survey-in-the-field data collection instrument which included six stand-alone decision scenarios, the content of which was germane to decisions made by administrators in Pennsylvania's K-12 public education sector—specifically school district superintendents and school principals—who routinely make decisions in domains of personnel management and organizational policymaking. As discussed in the *Literature Review*, the influences of anchoring bias and attribute framing bias are prevalent in these decision domains across other public administration sectors and were therefore targeted in this research study.

Quantitative Methodological Framework vis-á-vis the Research Questions

In the quantitative study, the overarching research question was three-fold: (1) Do anchoring bias and attribute framing bias influence decision-making of K-12 public education

administrators in decision domains of personnel management and organizational policymaking?; (2) Does a consider-the-opposite debiasing intervention mitigate the influences of anchoring bias and attribute framing bias on these administrators' decision-making?; and (3) Does the quality of consider-the-opposite feedback influence the effectiveness of debiasing mitigation? Quantitative methods suit this research purpose, because such methods require objective researchers and rest on a positivist paradigm, which assumes that human phenomena are measurable and predictable based on causal mechanisms (Hesse-Biber, 2017). This study had a deductive theoretical drive employed to transform the descriptive data—uncovered through inductive analysis of data collected in the qualitative study—into participant-relevant decision scenarios whose responses were measurable (Morse & Niehaus, 2009).

The main hypotheses centered on the relationship between the control group participants' responses, and between the control group and intervention group participants' responses to these decision scenarios, specifically whether there were statistically significant differences between the mean responses of each of four participant groups analyzed utilizing independent samples t-tests. By extension, for the intervention groups, hypotheses centered on the relationship between the quality of consider-the-opposite (COS) feedback and the mitigation effectiveness of COS feedback, specifically whether COS feedback quality predicted COS mitigation effectiveness analyzed utilizing linear regression modeling.

For the anchoring bias decision scenarios, the four participant groups comprised (1) high anchoring bias control group; (2) high anchoring bias intervention group; (3) low anchoring bias control group; and (4) low anchoring bias intervention group. For the attribute framing bias decision scenarios, the four participant groups comprised (1) positive framing bias control group;

(2) positive framing bias intervention group; (3) negative framing bias control group; and (4) negative framing bias intervention group.

Survey-in-the-Field Design

The survey-in-the-field design replicated the data measurements utilized in prior experimental research that observed the influences of anchoring bias and attribute framing bias. All dependent variables were measured utilizing a 0-100 scale on which participants indicated whole-digit responses representing anchoring bias influence (Bellé et al., 2017; Bellé, Cantarelli, & Belardinelli, 2018; Nagtegaal et al., 2020), or propensity responses representing attribute framing bias influence (Bellé, Cantarelli, & Belardinelli, 2018; Cantarelli et al., 2020; Cantarelli et al., 2020). The survey-in-the-field design included a personnel evaluation decision scenario and a personnel policy decision scenario that were utilized in an experiment by Bellé and colleagues (2018), and then partially replicated by Nagtegaal and colleagues (2020). (See Appendix G – *Anchoring Bias Decision Scenarios* #1 and #2).

To evaluate the influence of a consider-the-opposite (COS) debiasing intervention for anchoring bias, this dissertation research study partially replicated Nagtegaal and colleagues' (2020) experimental design, in which online survey respondents were required to cite (by typing) two reasons why the given anchor value, whether high or low, was not an appropriate choice. Such an *ex post* debiasing intervention served both theoretical and practical purposes (Nagtegaal et al., 2020). Theoretically, an explicit debiasing intervention like COS ensures that respondents who take an online survey actively consider how others might challenge or oppose their initial decision. Practically, a response requirement of citing only two contrary reasons is optimal enough to achieve the consider-the-opposite effect, yet it would not burden survey respondents to the point of survey response failure.

Further, to analyze the qualitative effect of the consider-the-opposite (COS) debiasing intervention, intervention group consider-the-opposite feedback was coded for quality, which partially replicated the work of Mussweiler and colleagues (2000). In randomized controlled experiments designed to observe and mitigate anchoring bias in decision-making, Mussweiler and colleagues (2000) instructed experiment group participants to provide "anchor-inconsistent arguments" (p. 1145) in the form of reasons why the anchor value was inappropriate. The researchers allowed an unlimited number of reasons, then the number of reasons was used in correlational analysis to observe its relationship with the anchoring bias mitigation effect (Mussweiler et al., 2000). However, COS debiasing feedback was limited to two reasons why others might challenge their decision. Then, to answer the novel research question regarding COS feedback quality, the research design involved coding COS feedback for quality. Each of two COS feedback responses were rated on a 0-3 scale: 0 = no valid response; 1 = below standard; 2 = standard; or 3 = above standard). Both COS feedback responses were combined (scaled 0-6), then utilized in linear regression modeling to analyze whether COS feedback quality predicted the COS interventional influence. The quality rating rationale is delineated in the *Mixed Methods Component* section below.

To evaluate the influence of a consider-the-opposite (COS) debiasing intervention for attribute framing bias, this dissertation research study replicated part of Cheng and colleagues' (2014) experimental design, in which in-person study participants were required to respond to the statement: "Please consider how others might challenge your decision and write down four possible alternatives" (p. 59). The researchers found that this *other*-consideration intervention had a significant mitigation effect on attribute framing bias decision responses when contrasted with responses by the control groups (Cheng et al., 2014). However, survey-in-the-field

participants were required to cite only two reasons why others might challenge their decision. Furthermore, debiasing intervention parallels the approach for mitigating anchoring bias decision scenarios as described in the foregoing section, to maintain consistency of response mode across the survey-in-the-field. As for the anchoring bias decision scenarios, the quality of COS feedback provided by attribute framing bias intervention group participants was coded and utilized in linear regression modeling to analyze whether COS feedback quality predicted the COS interventional influence.

Research Context and Setting

The K-12 public education sector in Pennsylvania was selected as the research context for several reasons. First, the researcher has worked in public and private educational institutions in Pennsylvania. Second, no known published experimental study on cognitive bias has been conducted with a sample of K-12 public education administrators in the state. Finally, Pennsylvania is a diverse, populous state that hosts 504 school districts, providing a varied cross-section of small, medium, and large school districts within town, rural, urban, and suburban regions. Specifically, the regional classification breakdown of school districts is: 35 town, 90 urban, 188 suburban, and 191 rural (Pennsylvania Department of Education, 2020).

The research setting itself was an online interface utilizing email and Qualtrics survey software to transmit the data collection instrument to study participants. Prospective study participants were contacted through Qualtrics via email, which included a study invitation message and a link to a Qualtrics electronic survey form that contained the informed consent statement (Appendix F) and the survey-in-the-field instrument (Appendix G). These participants most likely completed the survey-in-the-field instrument while located at their work site, since the researcher and her cooperating professional organizations emailed currently practicing K-12

public education administrators at their work email addresses. Study participants' Internet Protocol addresses were intentionally not tracked in Qualtrics to ensure anonymity of study participants, and because this data was not relevant to the dissertation research study.

Research Sample, Sampling Procedures, and Data Sources

Research Sample

The quantitative study sample (N = 300) consisted of currently practicing K-12 public school district superintendents, assistant superintendents, school principals, and assistant principals across Pennsylvania. These K-12 public education administrators were targeted because the research study aimed to evaluate the influence of cognitive bias in decision-making in domains of personnel management and organizational policymaking, domains in which these administrators make decisions in their everyday work. The quasi-experimental design entailed a control group of 178 participants and an intervention group of 122 participants.

Control Group Sample

To increase the viability of potential quantitative analytic approaches such as t-tests or linear regression, the control subgroup sample goal was a minimum of 30 participants in each of the four control subgroups (Abu-Bader, 2011): (1) low anchoring bias; (2) high anchoring bias; (3) negative framing bias; and (4) positive framing bias. There were between 86 and 95 participants in any of these control subgroups. Subgroup sample sizes varied because participants were randomly assigned by Qualtrics software to either a low or high anchoring bias decision scenario, of which there were three total decision scenarios; and to either a negative or positive framing bias decision scenario, of which there were three total decision scenarios.

Intervention Group Sample

As for the control group sample described above, the intervention group sample goal was a minimum of 30 participants in each of the four intervention subgroups, to increase the viability of potential quantitative analytic approaches such as t-tests or linear regression (Abu-Bader, 2011): (1) low anchoring bias; (2) high anchoring bias; (3) negative framing bias; and (4) positive framing bias. In the quantitative research study, there were between 28 and 33 participants in any of these intervention subgroups. However, unlike the control group survey-in-the-field, the intervention group survey-in-the-field was split into two separate instruments: (1) a survey-in-the-field containing the three anchoring bias decision scenarios; and (2) a survey-in-the-field containing the three-attribute framing bias decision scenarios.

As described below, each intervention group survey-in-the-field was assigned to one of the two professional associations that aided the researcher in distributing the data collection instrument to its respective members by direct email. As for the control group survey-in-the-field data collection procedure, anchoring bias intervention group participants were randomly assigned by Qualtrics software to either a low or high anchoring bias decision scenario, of which there were three total scenarios. Similarly, attribute framing bias intervention group participants were randomly assigned by Qualtrics software to either a negative or positive framing bias decision scenario, of which there were three total scenarios.

Quantitative Study: Sampling Procedures and Data Sources

The quantitative research study entailed a quasi-experimental design, given that participants were not randomized into control or intervention groups. Instead, the researcher intentionally designed the participant recruitment strategy based on an expected higher motivation of study participants to complete the less energy-intensive control group survey-in-

the-field, as opposed to study participants who were expected to be less motivated to complete the more energy-intensive intervention group survey-in-the-field, as further discussed below.

Quantitative study participants were recruited by email. The Qualtrics survey link was provided in an invitation email after a brief message to inform prospective participants about the study purpose and invite them to participate by clicking the survey link. The participant recruitment and data collection procedures consisted of three strands as follows.

The first strand of participant recruitment and data collection involved the researcher conducting internet searches of public school district websites across Pennsylvania, with the intention to systematically distribute the survey-in-the-field control group instrument in an equitable pattern by email to administrators employed in town, rural, urban, and suburban school districts. Study recruitment and survey distribution outreach was proportionate to the percentage of town, rural, urban, and suburban school districts in the state. Of 504 total school districts in Pennsylvania, the regional classification breakdown is: 35 town, 90 urban, 188 suburban, and 191 rural (Pennsylvania Department of Education, 2020). Thus, the school district recruitment outreach ratio was: 1 town: 3 urban: 6 suburban: 6 rural. Going by the school districts in alphabetical order within each regional classification, as sorted and tallied in an Excel spreadsheet, participant recruitment outreach was patterned by taking the first town school district, the first three urban school districts, the first six suburban school districts, and the first six rural school districts. This first strand data collection procedure was repeated throughout the data collection period, comprising 2,323 unique survey invitation emails delivered through Qualtrics software. As needed, follow-up emails were generated through Qualtrics software until robust control group sample sizes were obtained. Ultimately, 178 participants completed the control group survey-in-the-field, as response rate of about 8%.

The second and third strands of participant recruitment and data collection were facilitated on behalf of the researcher by two state-level professional associations: the Pennsylvania Association of School Administrators and the Pennsylvania Principals Association. To assist the researcher in distribution of the survey-in-the-field instrument, these two organizations issued site approval letters for the researcher's Institutional Review Board (IRB) application. Once IRB approval was obtained, the Executive Director of each organization distributed the study invitation and survey link by email directly to their members on the researcher's behalf. Each professional association was arbitrarily given one of two intervention group surveys-in-the-field to distribute, either the anchoring bias survey-in-the-field or the attribute framing bias survey-in-the-field.

This second-strand and third-strand split distribution approach was taken because the intervention group surveys-in-the-field were more energy-intensive than was the control group survey-in-the-field, since intervention group participants were asked to provide open-ended qualitative responses in addition to quantitative responses like for the control group participants. It was also expected that individuals who received a study invitation email directly from the dissertation researcher (via Qualtrics) would be less motivated to complete the survey-in-the-field for interventions groups, as compared to professional organizations which would lend credence to the research purpose and, hence, motivate their members to complete the longer survey-in-the-field. Arbitrarily, the anchoring bias intervention group survey-in-the-field (second strand) was distributed to members of the Pennsylvania Principals Association. 1,003 emails were distributed, of which 61 participants completed the survey with a response rate of about 6%. Of these 61 participants, the following current positions were represented: eight superintendents, 10 assistant superintendents, 35 principals, and eight assistant principals

(Appendix I). Similarly, the attribute framing bias intervention group survey-in-the-field (third strand) was distributed to members of the Pennsylvania Association of School Administrators. 775 emails were distributed, of which 61 participants completed the survey with a response rate of about 8%. Of these 61 participants, the following current positions were represented: 35 superintendents, 13 assistant superintendents, 11 principals, and two assistant principals (Appendix I).

Research Integrity

Participant Risks and Benefits

Minimal to no risks to quantitative study participants were anticipated. Although there were no direct benefits to study participants, participants may have gained some knowledge of cognitive bias as explained in the study debriefing message (Appendix H). Overall dissertation research study results are expected to contribute to the public administration literature, and the quantitative research design may serve as a model for research replication.

If there was any risk to participants, albeit minimal, this may have related to the partial non-disclosure employed in the data collection method. However, it was necessary to limit participant knowledge of the research topic, research questions, and hypotheses to allow the quasi-experiment design to proceed without study participant bias. Upon debriefing, study participants were fully informed of the quantitative study purpose, which should have assured them of the need for partial non-disclosure in the research design (Appendix H).

Participant Confidentiality

Quantitative study participants' identities were safeguarded by utilizing an anonymous link in Qualtrics survey software. No study questions elicited any personally identifying information. Published study results pertain only to generic participant information that is not

connected to participants' names or their school district names—e.g., current position, age, school district size, education level, years in current position, and total years in a public education administration position. Research data has been kept on the researcher's password-protected computer using password-protected software: Qualtrics, Microsoft One Drive, and SPSS. Only the researcher and the researcher's dissertation advisor have access to the data. Data will be retained for a minimum of three years after the date of dissertation publication per federal guidelines.

Informed Consent

In the quantitative study, participants were provided with an electronic informed consent statement (Appendix F) on the initial screen of their respective survey-in-the-field online surveys. Participants were instructed to indicate their consent to participate in the study by clicking the arrow ("next") button at the bottom of that initial screen, which then launched the beginning screen of their respective survey-in-the-field.

Instruments and Procedures

Data Collection Instrument

In the quantitative study, the researcher employed an electronic survey-in-the-field data collection instrument that was designed utilizing Qualtrics software. The survey-in-the-field included three versions distributed in three strands as described above: (1) anchoring bias control group and attribute framing bias control group (2) anchoring bias intervention group; and (3) attribute framing bias intervention group. The both-control-groups survey-in-the-field (first strand) contained all six decision scenarios, which prompted participants for a quantitative response to each decision scenario. Each decision scenario was displayed on a single screen in Qualtrics and was identical in content, except for a biasing statement related to either high or low

anchoring in the anchoring bias decision scenarios; or related to either positive or negative framing in the attribute framing decision scenarios. Intervention group participants, who were split into strands two and three, were prompted to respond to the same decision scenarios as their counterparts in the anchoring bias control group or attribute framing bias control group, but prior to providing a quantitative response for each decision scenario, intervention group participants were asked to cite (by typing) two reasons why others might challenge their decision, in order to demonstrate concrete evidence that they had considered alternate viewpoints (e.g., *considered the opposite*). The *Quantitative Study Results* section reports on the number of study participants in each group and how they were randomized by Qualtrics to a high-low anchoring bias pole or a positive-negative framing bias pole within each of the three survey-in-the-field online instruments.

Data Measurements

Overview of Variables in Independent Group Comparisons

Survey-in-the-field participant responses to anchoring bias and attribute framing bias decision scenarios were the dependent variables consisting of continuous data in the independent samples t-test model utilized for quantitative data analysis. This statistical model served to resolve the research hypotheses with respect to the influence of independent and interventional variables consisting of categorical data; specifically, influences of low anchoring bias and high anchoring bias, and influences of positive framing bias and negative framing bias. For anchoring bias, these four groups were: low anchoring control group; low anchoring intervention group; high anchoring control group; and high anchoring intervention group. For attribute framing bias, these four groups were: positive framing control group; positive framing intervention group; negative framing control group; and negative framing intervention group. The independent

samples t-test model analyzed between-group differences regarding the influence of each independent variable group on the dependent variable (decision-making response) between the corresponding control groups (e.g., low anchoring bias versus high anchoring bias), and between the corresponding control groups and intervention groups (e.g., positive framing control versus positive framing intervention).

Variable Measurements

Dependent Variable: Participant Responses to Decision Scenarios

Study participant responses to decision scenarios were operationalized as indicators of the influences of anchoring bias and attribute framing bias. All decision scenario responses were captured in Qualtrics using its 0-100 slider feature as justified herein. In the three *anchoring bias* decision scenarios, all participants were required to indicate a whole-digit number in response to questions, for example, "How many days would you set for this policy?" The 0-100 slider response feature was employed because reasonable responses would fall within that range, and for ease and consistency of response method throughout the survey. In the three-attribute *framing bias* decision scenarios, all participants were required to indicate the propensity to take a given course of action. Propensity was measured as per cent likelihood, or plainly speaking, *on a scale of 0-100, how likely are you to support policy X?* The 0-100 slider response feature was employed because 0-100 is the precise range of likelihood. In Qualtrics, the *force response* feature was enabled to ensure that participants completed each survey response before moving on to the next screen. If study participants elected not to proceed to completion, results from incomplete surveys were not included in the data analysis. There were 47 incomplete surveys, none of which counted toward the study sample total.

Interventional Variable: Consider-the-Opposite Feedback Quality

It was hypothesized that the quality of consider-the-opposite feedback would influence the direction of the consider-the-opposite (COS) feedback on intervention group responses to decision scenarios. In short, the higher the COS feedback quality, the stronger the debiasing influence. To analyze the quality of COS debiasing feedback (e.g., citation of two reasons why others might challenge their decision), intervention group participants' responses also consisted of qualitative text data. These qualitative responses were captured in Qualtrics using its open text response feature.

In the three *anchoring bias* decision scenarios, intervention group participants were prompted to cite two reasons why their decision could be challenged by others *in addition to* responding quantitatively to a question like *How many days would you set for this policy?* In the three-attribute *framing bias* decision scenarios, intervention group participants were prompted to cite two reasons why their decision—the propensity to support a given policy option—could be challenged by others *in addition to* responding quantitatively to a question like *On a scale of 0-100, how likely are you to support policy X?*

In Qualtrics, the force response feature and content validation feature were enabled to ensure, respectively, that intervention group participants completed each survey response and provided the required types of responses. If study participants elected not to proceed to completion, results from incomplete surveys were not included in the data analysis. Consider-the-opposite (COS) feedback was then analyzed and coded with a quality rating (scaled 0 to 3) to resolve the hypotheses regarding the relationship between COS feedback quality and the direction of debiasing mitigation. The quality-coding analytical procedure is discussed in the *Mixed Methods Component* section under *Data Analysis* below.

Procedures to Increase Instrument Validity and Reliability

A data collection instrument must be both valid and reliable to achieve valid results in a quasi-experimental study (Black, 1999). To improve upon prior research limitations, decision scenarios were tailored to befit the quantitative study participants' experience and expertise. To determine relevant and reasonably valid decision scenarios for the quantitative survey-in-the-field instrument, the researcher first conducted qualitative structured written interviews of retired K-12 public school superintendents and principals, in which respondents were asked open-ended questions that elicited types and examples of decisions that these administrators made in domains of personnel management and organizational policymaking (Appendix C). Quantitative research design validity would have otherwise been lower, because survey-in-the-field responses also depended on decision scenario relevance to the research participant (Black, 1999). In sum, the researcher aimed to reduce confounding influences that could have distorted or intensified the influences of the independent variable: the cognitive biases under experiment. How this qualitative data informed the quantitative research study design and increased the face validity and content validity of the survey-in-the-field instrument is elaborated in the *Data Analysis and Results* chapter.

To further increase instrument validity and reliability, the researcher had wanted to conduct a pilot study of the quantitative survey-in-the-field instrument with the same sample of qualitative study participants. Unfortunately, this was not feasible given the time needed for the Institutional Review Board to approve the second-stage quantitative study prior to the intended data collection period for the quantitative study. Quantitative data collection was to begin January 2022 when elementary and secondary schools returned from winter break amid increasing COVID-19 restrictions in schools and vehement political opposition to these

restrictions throughout Pennsylvania. The researcher needed to allow enough time for the quantitative study to be completed during the spring semester of that K-12 academic year from January to May 2022.

Data Collection

Data Collection Methods and Procedures

In the quantitative study, the researcher employed a quasi-experimental design due to the complexity and time-intensiveness of survey-in-the-field tasks for intervention group participants. Three separate survey-in-the-field versions were employed during three strands of data collection. The first strand entailed data collection from participants for the control groups combining both anchoring bias and attribute framing bias decision scenarios (all six decision scenarios) into a single survey-in-the-field instrument. The second and third strands entailed data collection from participants for the anchoring bias and attribute framing bias intervention groups, respectively. Each strand of intervention group participants was given a survey-in-the-field containing either only the three *anchoring bias* decision scenarios, plus a consider-the-opposite task for each decision scenario; or only the three *attribute framing bias* decision scenarios, plus a consider-the-opposite task for each decision scenario. The first strand of data collection was conducted directly by the researcher, whereas the second and third strands of data collection were facilitated, respectively, by two state professional organizations: the Pennsylvania Principals Association and the Pennsylvania Association of School Administrators.

First Strand of Data Collection to Obtain Control Group Data

During the first strand of data collection, the link to the online survey-in-the-field was distributed by the researcher utilizing the automated email feature in Qualtrics. The researcher emailed about 500 to 1,000 prospective study participants every Wednesday, from January

through March 2022. During the first strand of quantitative data collection, the researcher utilized an Excel spreadsheet to save and track the email addresses of prospective participants that she had searched and then utilized in weekly mass emails automated through Qualtrics. The email addresses and date of each week's initial mass email was tracked in separate sub-sheets within the spreadsheet. A total of 2,323 unique email addresses were contacted by the researcher via Qualtrics for recruitment of control group participants. The researcher scheduled weekly follow-up emails for up to three weeks following the initial email outreach to each batch of recipients who had not yet completed the online survey-in-the-field instrument.

The email message first greeted and invited prospective participants to join the study. Once participants opened the survey by clicking the survey link embedded in the email, participants were shown the Informed Consent Statement (Appendix F) on the initial screen. To demonstrate acceptance of the Informed Consent Statement, participants were instructed to click the right-arrow ("next") button to proceed to the survey. The survey-in-the-field instrument contained six decision scenarios each presented on one screen at a time with a question for participants to answer. The survey-in-the-field of six decision scenarios was followed by collection of demographic, professional, and school district data about the participant. Each decision scenario question and participant data question had to be answered before participants could advance to the next screen, as enforced by the force response feature in Qualtrics.

Second and Third Strands of Data Collection to Obtain Intervention Group Data

During the second and third strands of data collection, two state professional organizations—the Pennsylvania Principals Association and the Pennsylvania Association of School Administrators—facilitated the intervention group participant recruitment process on the researcher's behalf. Due to the time- and energy-intensive nature of the intervention group

survey-in-the-field, the researcher split the anchoring bias decision scenarios and attribute framing bias decision scenarios into two surveys-in-the-fields. Each separate survey-in-the-field was then assigned to one of the two professional organizations. The assignments were arbitrary, as follows: The anchoring bias intervention group survey-in-the-field was assigned to the Pennsylvania Principals Association. The attribute framing bias intervention group survey-in-the-field was assigned to the Pennsylvania Association of School Administrators. The researcher provided the Executive Director of each organization an email message template that they could disseminate through mass email delivery to their respective members. The email message first greeted and invited prospective participants to join the study, and finally included a link to the survey-in-the-field assigned to that organization.

Once participants opened the online survey-in-the-field instrument by clicking the Qualtrics survey link embedded in the email, participants were shown the Informed Consent Statement (Appendix F) on the initial screen. To demonstrate acceptance of the Informed Consent Statement, participants were instructed to click the right-arrow ("next") button to proceed to the survey. The survey-in-the-field instruments contained three decision scenarios each presented on one screen at a time with a question for participants to answer, followed by collection of demographic, professional, and school district data about the participant. Each decision scenario question, consider-the-opposite task, and participant data question had to be answered before participants could advance to the next screen, as enforced by the *force response* feature in Qualtrics. If study participants elected not to proceed to completion, results from incomplete surveys were not included in the data analysis.

As mentioned above, for quantitative survey-in-the-field data collection, study participants were asked to provide demographic, professional, and school district data. This data

collection was reserved as the final series of questions in the survey, to engage participants with the decision scenario tasks straightaway and then prompt participants to answer routine questions afterward (Rudestam & Newton, 2015). Participant data included the following: (1) age (years as a continuous variable); (2) position currently held (checklist as a categorical variable); (3) years in current position (years as a continuous variable); (4) total years in K-12 public education administration positions (years as a continuous variable); and (5) school district size (number of enrolled students as a continuous variable).

Data Collection Period

Once the first-stage qualitative study was complete in November 2021, the researcher submitted an application for the second-stage quantitative study to the Institutional Review Board (IRB). The second-stage quantitative study received IRB approval in late November 2021, as planned before the Fall 2021 semester ended, so that quantitative data collection could commence during the Spring 2022 semester. Quantitative data collection took place from January to April 2022, allowing the researcher time to obtain adequate samples for the control and intervention groups.

Data Analysis Justification

Quantitative Methods Component

Independent samples t-tests were the statistical tools employed to resolve the six research hypotheses concerning between-group means analyses: H1, H2a, H2b, H4, H5a, and H5b. This was an appropriate statistical tool, because hypotheses were posited for all between-group comparisons within each decision scenario. Across all three strands of data collection, each anchoring bias decision scenario or attribute framing decision scenario involved three between-group comparisons among four continuous dependent variables of interest. For the anchoring

bias decision scenarios, these dependent variables consisted of quantitative responses provided by the: (1) high anchoring bias control group; (2) high anchoring bias intervention group; (3) low anchoring bias control group; and (4) low anchoring bias intervention group. For the attribute framing bias decision scenarios, these variables consisted of quantitative responses provided by the: (1) positive framing bias control group; (2) positive framing bias intervention group; (3) negative framing bias control group; and (4) negative framing bias intervention group. Moreover, the partially replicated decision scenarios in prior studies were evaluated with independent samples t-tests. Therefore, by employing the same statistical tool, certain results of this dissertation quantitative study could be compared to prior studies' results regarding between-group means differences and effect sizes (Cohen's *d*). The standard 95% confidence level was used to determine statistical analyses, with the critical level $\alpha=.05$, such that results with $p<.05$ were deemed statistically significant.

Mixed Methods Component

Coding the Quality of Consider-the-Opposite Feedback

The interventional variable *consider-the-opposite (COS) feedback* was hypothesized to influence the quantitative responses given by the intervention groups in each decision scenario. Intervention group participants provided COS feedback by typing two open-ended text responses—citing two reasons why someone might challenge their decision—to demonstrate that the intervention took place, at least theoretically. Each instance of qualitative feedback was analyzed and coded numerically on a scale of zero to three, and then analyzed quantitatively as discussed below.

The coding procedure for evaluating the quality of COS feedback in both anchoring bias intervention groups and attribute framing bias intervention groups was as follows. For each COS

feedback response provided an intervention group participant, a quality rating on an interval scale was assigned as: 0 = no valid response; 1 = below standard; 2 = standard; or 3 = above standard. *No valid response* (0) meant that the participant failed to provide feedback at all or did not provide relevant feedback. *Below standard* (1) meant that the participant failed to provide enough feedback or feedback that was considered effective as a debiasing mechanism. *Standard* (2) meant that the participant provided feedback that was considered effective as a debiasing mechanism. *Above standard* (3) meant that the participant provided more feedback than was requested and/or the feedback was considered particularly effective as a debiasing mechanism. The two COS feedback responses were then combined into a single interval variable scaled zero to six. To note, no prior researcher had posed a research question asking whether the quality of debiasing intervention feedback would make a difference for the interventional influence, so this feedback quality rating scheme was without precedent.

Evaluation of Intervention Group Responses on Consider-the-Opposite Feedback Quality

A linear regression model was the statistical tool employed to resolve the four research hypotheses concerning the relationship between consider-the-opposite (COS) feedback and direction of debiasing mitigation: H3a, H3b, H6a, and H6b. This was an appropriate statistical tool, because across strands two and three of data collection, each anchoring bias decision scenario or attribute framing decision scenario involved the interventional variable of interest. For the anchoring bias decision scenarios, this interventional variable of interest consisted of qualitative COS feedback responses provided by the: (1) high anchoring bias intervention group; (2) low anchoring bias intervention group; (3) positive framing bias intervention group; and (4) negative framing bias intervention group. A multivariate regression model could be employed if

any covariates were found significantly different between dependent variables, such that a regression analysis could determine whether COS feedback quality and any covariate(s) significantly predicted the direction of intervention group responses to decision scenarios. As mentioned earlier in this *Data Analysis Justification* section, the standard 95% confidence level was used to determine statistical analyses, with the critical level $\alpha=.05$, such that results with $p<.05$ were deemed statistically significant.

Role of the Researcher

Researcher Role in Planning the Dissertation Study

The dissertation author is the sole researcher who planned the study. The initial stage of research design took place during her first year as a doctoral student. While taking the Pre-Doctoral Seminar and Research Design courses simultaneously, she took an interest in Bellé and colleagues' (2018) experimental study on cognitive bias in public administrator decision-making, on which she based a translation memo for the Pre-Doctoral Seminar course. She utilized the Research Design course to design a randomized controlled experimental study modeled on a synthesis of research on cognitive bias related to Bellé and colleagues' (2018) study. The research design evaluated two cognitive biases—anchoring bias and asymmetric dominance bias—and the effectiveness of an *ex ante* nudge debiasing intervention, which involved an instructive warning about the biases in effect. The research sample included K-12 public education administrators.

In the subsequent semester, the researcher took a Public Finance and Budgeting course, in which she wrote a translation memo based on Congdon and colleagues' (2011) treatment of cognitive bias and bounded rationality concepts in *Policy and Choice: Public Finance through the Lens of Behavioral Economics.* While concurrently taking a Quantitative Research Methods

course, she elected to focus her dissertation on cognitive bias utilizing primarily quantitative research methods. Hence, the researcher developed and planned the dissertation research design over a year's time, during which the research questions and hypotheses were contextualized within and continually informed by numerous literature review iterations. This final dissertation methodology is a product of synthesis and interpretation of prior research methods and findings, including a qualitative component that gave rise to a more nuanced hypothesis regarding the effectiveness of consider-the-opposite debiasing interventions vis-á-vis the quality of consider-the-opposite feedback responses, which no known researcher had yet hypothesized.

Researcher Role in Conducting the Study

The dissertation author was the sole researcher who conducted the study. The research design was kickstarted by a survey-in-the-field draft during her Research Design course, as discussed in the foregoing section. From there, the research design evolved into its current form with due consideration of the dissertation literature review and of input from the qualitative data analysis. Upon completion of the qualitative data analysis, the quantitative survey-in-the-field instrument was drafted and submitted to the Institutional Review Board for approval.

To collect quantitative data from control groups, the researcher followed a scheme of equitable online survey-in-the-field distribution to rural, town, urban, and suburban school districts across Pennsylvania. She searched for and catalogued email addresses of K-12 public school district superintendents and school principals from their respective school district websites. During the email address search and cataloging process, the researcher utilized a Qualtrics survey interface to mass email the survey-in-the-field instrument link to all individuals who held the target administration positions within the selected school districts. This researcher-

to-participant recruitment outreach continued for about three months until a satisfactory sample (n = 178) was obtained.

To assist with survey-in-the-field distribution to collect data from intervention groups, the researcher sought multiple Pennsylvania state professional organizations for public school administrators. Two of these organizations agreed to assist: the Pennsylvania Association of Public School Administrators and the Pennsylvania Association of School Principals. These organizations' Executive Directors were the primary contacts and who emailed the research study invitation message (Appendix E) and Qualtrics survey-in-the-field link to all organization members whose positions were targeted in the study sample: school district superintendents and school principals. Upon receipt of survey-in-the-field data from research participants in Qualtrics, the researcher monitored data collection and followed up with the organizations' Executive Directors to encourage a second and third email distribution to their members, which they did to boost survey-in-the-field response rates.

Researcher's Biases, Beliefs, and Assumptions

No researcher is without bias, from selection of a research topic and sample population to formation of the problem, research questions, hypotheses, and research design to interpretation and discussion of the results. The dissertation author had prior training in philosophy with a bent for pragmatism; in psychology with an interest in why and how the mind works as it does; and in pedagogy with the intent to accumulate and transmit knowledge for the betterment of our world. Thus stemmed the behavioral public administration theoretical framework for her research questions, essentially asking: *Does cognitive bias inhibit rational decision-making among public administrators?* And, if it does: *How can cognitive bias in these administrators' decision-making be effectively mitigated?*

Furthermore, the researcher assumes that if these cognitive biases could be mitigated in semi-controlled, laboratory-like experiments, as demonstrated in prior experimental research, she could then scale up a consider-the-opposite intervention and apply it in the real world of public administration practice. Certainly, a one-off debiasing intervention as tested in this quantitative research study was never assumed to have a long-lasting effect on study participants. Nevertheless, the researcher believes that she can extend this dissertation's research methods and results on a longer-term, more-intensive basis to effect significant change in public administrators' attitudes and approaches toward decision-making. She envisions a pragmatic implementation of organizational trainings on cognitive bias and debiasing intervention strategies like consider-the-opposite, which can be learned, integrated, and routinely applied by public administrators in all sectors.

Design Delimitations and Limitations

Delimitations

This dissertation research study design was delimited by the target decision domains and the sampling frame. Decision domains of personnel management and organizational policymaking were selected in order to partially replicate prior experiment research on the influences of anchoring bias and attribute framing bias in these domains. The influences of these two cognitive biases have been empirically observed in these decision domains, as discussed in the *Literature Review* chapter. This dissertation research study aimed to partially replicate and extend such experimental studies with a novel study sample and public sector location: K-12 public education administrators in Pennsylvania, as elaborated below.

In terms of the sampling frame, former K-12 public education administrators were purposively sampled for the first-stage qualitative study, whereas currently practicing K-12

public education administrators were quasi-randomly sampled for the second-stage quantitative study. In both studies, recruited participants included K-12 public school district superintendents and school principals in head and assistant positions, where results of the qualitative study were utilized to hone the scope and content of decision scenarios presented to quantitative study participants. This mixed-method sampling design was undertaken mainly to increase the validity of the quantitative study, such that decision scenarios were made germane to these administrators' decision-making contexts and the types of decisions they routinely make. In addition, the qualitative study was conducted to determine relevant decision-making examples in part due to observed flaws in prior behavioral public administration research, in which the decision scenarios posed to study participants were not always germane to the participants' real-world professional decision-making contexts.

Limitations

The most salient dissertation study limitation relates to the sample and timing for the qualitative data and quantitative data collection. The data collection periods occurred during the peak of the COVID-19 pandemic, from August 2021 to March 2022. Although in-person interviews or focus groups were ideal research settings for the qualitative study, an online interview questionnaire was employed to collect data from qualitative study participants. During the 2021-22 school year in Pennsylvania, school mask mandates and remote schooling became divisively controversial, inciting parents and other stakeholders to express hostility toward K-12 public school administrators. These distractions and pressures likely presented barriers to quantitative data collection, which was carried out over three months from January to March 2022, whereas the data collection period might have been shorter or less intensive had the target study population been operating under normal conditions.

As a result, a quasi-experimental design was employed for the quantitative study, as elaborated earlier in this subchapter and in the *Discussion* chapter. Additionally, to compensate for the anticipated lower control group participant response rate, participant recruitment email volume was kept high at rates of 217, 948, 673, and 485 emails in each of the first four weeks, respectively, which totaled 2,323 unique emails. Every control group survey non-response was followed up on a weekly basis for two additional weeks, or until the email recipient completed the survey, utilizing the Qualtrics automated email repeat feature. Similarly, for the two strands of intervention group data collection, the researcher asked the Executive Directors of the two professional associations to follow up with a second and third email distribution to again invite their respective members to participate in the study.

Summary

This *Data and Methods* chapter was divided into two subchapters for the first-stage qualitative study and second-stage quantitative study, each of which included the following key information. The introduction section provided an overview of the research design, and a restatement of the qualitative research questions and of the quantitative research questions and hypotheses. The quantitative research questions and hypotheses were discussed in relation to the research design, variable operationalization, and data analyses. The mixed-method research design rationale was explicated in the context of prior experimental research, which was partially replicated and synthesized in this research study to form the basis for quantitative data measurements and data analytic techniques.

Quantitative data measurements consisted of: (1) attribute framing bias and anchoring bias influences on decision-making, which are categorical independent variables; (2) responses to attribute framing bias decision scenarios and responses to anchoring bias decision scenarios,

which are continuous dependent variables; (3) the quality of consider-the-opposite feedback, which is a qualitative interventional variable that was coded quantitatively; and (4) study participant data—age, education level, years in current position, and total years in public education administration positions—collected for potential inclusion as covariates in the multivariate data analysis. The above variables numbered (1) and (2) fit into the independent samples t-test means analysis to resolve Research Hypotheses H1, H2a, H2b, H4, H5a, and H5b. The above variables numbered (2), (3), and potentially (4) fit into the multivariate regression model to resolve Research Hypotheses H3a, H3b, H6a, and H6b.

The data collection method was explicated in terms of sampling procedures, the data collection period, and ethical considerations for the Institutional Review Board approval process. Research participants were recruited in three sampling strands: (1) *control group sample:* direct email outreach by the researcher, who followed an equitable survey distribution scheme to ensure a representative sample of K-12 public education administrators from town, rural, suburban, and urban school districts across Pennsylvania; and (2) *anchoring bias intervention group* and (3) *attribute framing bias intervention group:* two state-level K-12 public education administration professional organizations each distributed an invitation and survey-in-the-field Qualtrics link by email to their members. The data collection period comprised research participant recruitment and monitoring of response rates from January 10, 2022, through March 31, 2022. Ethical considerations included provision of an Informed Consent Statement (Appendices A and E), to which the qualitative study and quantitative study participants were required to agree prior to accessing their respective surveys. It also included a Participant Debriefing Statement (Appendices C and F), which fully informed participants of the

quantitative research study's main purposes, given that a degree of non-disclosure was required to attain genuine study results.

Finally, the researcher's role in planning and conducting the study was discussed, as were the researcher's biases, beliefs, and assumptions during the planning, conducting, and analyzing stages of the dissertation research study. The dissertation author was the sole designer, planner, and conductor of the research study, which was conceived, developed, and refined during four foundational courses in her Doctor of Public Administration program prior to undertaking the dissertation. Fittingly, the researcher then revealed her bias toward the research topic, placing its selection and the research study aim in the context of her educational and occupational experiences. The researcher was driven foremost by the belief that the procedures and results of this dissertation research study would be of pragmatic value to the public administration literature and to individuals who are preparing for or who currently practice in public administration.

Chapter IV: Data Analysis and Results

Qualitative Study Results

This sub-chapter reports on the analysis of data obtained from qualitative study participants—former K-12 public education administrators—in answer to two overarching research questions. To discover the phenomenon of decision-making, the two research questions were: (1) *What types of decisions do K-12 public school administrators make in the domain of personnel management?* and (2) *What types of decisions do K-12 public school administrators make in the domain of organizational policymaking?* Within each decision domain—personnel management and organizational policymaking—multiple sub-questions formed the qualitative structured written interview questionnaire to which former K-12 public school administrators provided open-ended text responses.

The qualitative study sample included 12 retired K-12 public school superintendents and/or school principals, all of whom had practiced in Pennsylvania except for one who had practiced in New Jersey. The qualitative study purpose was to obtain data that would inform the content and context of the data collection instrument—a survey-in-the-field—in the quantitative study that followed. In brief, in the first-stage qualitative study, former K-12 public school administrators were asked to provide types and examples of the decisions they made in those domains, in order to increase the validity of the second-stage quantitative study, whose participants were K-12 public school administrators currently practicing in Pennsylvania.

Presentation of Qualitative Study Results

The qualitative study results are organized by research sub-question. For each sub-question (i.e., interview question), three main aspects are delineated: (1) a summary of the phenomenological analysis of participant responses about decision-making vis-à-vis

collaborative, policy oriented, or isolated contexts; (2) a data table outlining the raw data and coding per analysis of decision-making context (collaborative, policy oriented, or isolated); and (3) excerpts of participants' written statements that exemplify and support the interpretation of decision-making context analysis. In cases where a specific decision sub-domain (e.g., personnel evaluation) was selected to target in the quantitative study, elaboration and justification are provided therein. In almost all decision sub-domains, the superintendents and school principals' decision-making occurred in a collaborative context. Hence, five of six quantitative survey-in-the-field decision scenarios were crafted to include cognitive biasing statements that referenced input from others or the typical practice of others. By contrast, in the sub-domain of personnel evaluation, the administrators' decision-making occurred in an isolated context. Hence, one quantitative survey-in-the-field decision scenario centering on a personnel evaluation decision was crafted to include a cognitive biasing statement that referenced a decision made in isolation.

Personnel Management Decision Domains

Personnel Hiring Decisions

RQ1a: In the domain of personnel management, what specific types of decisions do K-12 public education administrators make about people in **hiring?**

Summary of Collaborative Contexts for Personnel Hiring Decisions

The qualitative data suggests that for personnel hiring decisions, school principals and school district superintendents work collaboratively within their offices and across levels of administrators (Table 1). All 12 study participants indicated that hiring decisions were characterized by a multi-stage, collaborative decision-making process. Although the school district superintendent typically has the final say and/or veto power over hiring decisions, collaborative approaches prior to the final interview stage typically involve a series of screenings

and interviews, conducted by groups of individuals during early and middle stages. As one study participant reported, the hiring process may differ depending on school district size. Larger school districts might, for instance, employ a human resources director or a business manager who is responsible for hiring support personnel. Whereas in smaller school districts, the superintendent and/or assistant superintendent are chiefly responsible for hiring all supervisory, instructional, and support personnel. When hiring faculty and administrators, study participants reported that the screening process is typically standardized. Job candidates must produce the same materials such as a résumé, higher education transcript(s), and letters of recommendation, and they must answer a standard set of questions during phone and in-person interviews.

Table 1. Hiring Decisions: Qualitative Data Analysis Results

Raw Data	**Frequency**	**Decision Context Code**
Subcommittees conduct first round interviews / recommend candidate(s) to Superintendent, Asst. Supt., or HR Director to conduct final interview	4	Collaborative
Collaborative approach / joint effort among building-level administrators	4	Collaborative
"Vacancies begin with principal and assistant principal"	2	Collaborative
"Joint review … to determine the top two or three candidates"	1	Collaborative
"Village" interviews of administrator candidates with 20-25 stakeholders (board, administrators, parents, teachers, et al.)	1	Collaborative
"Extensive team interviews with administrative candidates"	1	Collaborative
School board majority approval required to hire Superintendent's recommended candidate	4	Collaborative
TOTAL	**17**	**Highly Collaborative**

Critical Data from Qualitative Study Participants about Personnel Hiring Decisions

A former School District Superintendent stated: "In public school districts, the school board makes the final decision on hiring new candidates to fill vacancies. Typically, it is a joint effort among building-level administrators and the superintendent and assistant superintendent. Many districts have an HR director who oversees the process. Most often, building level vacancies begin with the principal and assistant principal. … A joint review is then held to determine the top two or three candidates. … The head administrator at the particular level will then make a recommendation to the HR Director or Superintendent. … Most often, the Superintendent will conduct a final interview with the top candidate. … Only when the majority of school board members vote to support the recommendation, then is the candidate officially hired."

A former School District Superintendent stated: "The size of the school district will influence the level of involvement. Generally, initial screening and interviews were a function of the immediate supervisor for that position. A finalist(s) completed a final interview with the principal, immediate supervisor and me. The final decision was made collaborative (sic) with the immediate supervisor and/or principal. I maintained veto authority over any candidate. In larger districts, I took responsibility for all professional staff and let the Business Manager fulfill responsibilities for support personnel."

A current School District Superintendent stated: "... I am intimately involved in the hiring of all administrators. I also meet with the finalist for all professional positions. In the admin position searches we consider the 'paperwork' first and bring in 15 to 20 people for brief (10-15 minute) screening interviews. From there we bring 6 to 10 people in for our "village" interviews. These are 45-minute interviews with approximately 20 - 25 stakeholders (depending

on the position - includes Board members, administrators, parents, community members, support staff, teachers, students). From there 2 to 3 candidates move forward."

A former School District Superintendent stated that his responsibilities included: "hiring administrators, teachers, classroom aides, coaches, and consultants," and that "(a) collaborative approach was used to make hiring decisions as well as an exhaustive review of (applicants') past assignments, evaluations and references."

A former School District Superintendent stated: "The collaborative hiring process included "(establishing) subcommittees to conduct first round interviews and submit recommendations to me; review said recommendations with superintendent's cabinet and identify finalists; contact listed references and others who may be familiar with finalist; and interview finalists and recommend candidates to school board for appointment."

A former School District Superintendent stated: "I directly hired all educational administrative leadership positions at the building principal level, plus all cabinet level central office positions. We conducted extensive team interviews with administrative candidates."

A former Assistant High School Principal stated that: "During the initial screening process, we usually selected the top four or five candidates and asked them to sit for an interview with me, the department chair of the relative department, and several veteran teachers. The purpose of those interviews was to determine if the applicant matched the application and to see how well the team felt the applicant would fit into the culture of the school. Once the interviewees were rank ordered by the interview panel, a primary and alternate recommendation were forwarded to the assistant superintendent, who would interview the two candidates and make a final recommendation to the superintendent and school board."

Personnel Evaluation Decisions

RQ1b: In the domain of personnel management, what specific types of decisions do K-12 public education administrators make about people in **evaluations?**

Summary of Isolated Contexts for Personnel Evaluation Decisions

The qualitative data suggests that for personnel evaluation decisions, school principals and school district superintendents make decisions in isolation (Table 2). All 12 study participants, who were either school principals and/or school district superintendents, reported that they had personally evaluated direct reports and/or individuals who work under their overall supervision. Among study participants, personnel evaluation methods varied from perfunctory checklists that seldom informed meaningful feedback, to comprehensive measurement tools that evaluated professional qualities like teaching skill, personal qualities like demeanor under stress, and goals that faculty and staff members had set for themselves.

This qualitative evidence indicates that personnel evaluation is a decision domain in which cognitive bias could go unchecked, given the tendency for K-12 public school administrators to conduct personnel evaluations in isolation and to utilize unstandardized evaluation frameworks. Based on this input, the personnel evaluation domain was selected as a target decision domain for the quantitative data collection instrument. Specifically, one of the anchoring bias decision scenarios centered on a personnel evaluation with respect to the employee's prior year personnel evaluation score. The anchoring bias statement cited the employee's prior year total personnel evaluation score on a 0-100 scale, either at a high anchoring (83) or low anchoring (57) extreme value, which served to, respectively, inflate or deflate the total evaluation score that quantitative study participants would assign to the employee on this year's personnel evaluation.

Table 2. Personnel Evaluation Decisions: Qualitative Data Analysis Results

Raw Data	Frequency	Decision Context Code
Superintendent (Supt.) evaluated instructional / support supervisors and administrators	3	Isolated
Supt. performed one of four annual teacher evaluations.	1	Isolated
Department chairs annually evaluated members	3	Isolated
Supt. evaluated all direct reports	2	Isolated
Supt. reviewed / confirmed principal evaluations	1	Collaborative
Supt. evaluated employees at all levels of district	2	Isolated
Principal and dept. chair evaluated teachers	1	Isolated
Asst. Principal evaluated paraprofessional staff	1	Isolated
TOTAL	**12 Isolated 1 Collaborative**	**Highly Isolated**

Critical Data from Qualitative Study Participants about Personnel Evaluation Decisions

A former School District Superintendent stated: "I used district approved evaluation instruments for administrators, faculty and support staff. Dept. (Supervisor) - direct evaluation at least 3 times/year; Principal - direct evaluation at least once per year; (Superintendent) - direct evaluation of administrators and untenured faculty once per year."

A former School District Superintendent stated: "I was responsible for evaluating all instructional and support administrative and supervisory positions. In addition, I performed one of four annual instructional evaluations for the teaching staff. Immediate supervisors performed the annual evaluations for their department members at the end of the year."

A former School District Superintendent stated: "I evaluated all of my direct reports. My direct reports were usually the cabinet level administrative central offices positions, like the assistant Superintendents, Business Manager; HR Manager; special education Directors; technology directors; and curriculum directors. I also reviewed and confirmed all the evaluations for all building principals. In my evaluations - everything always counted - everything!"

A current School District Superintendent stated: “I have surprisingly few direct contacts that I officially evaluate, (which are my) admin assistant, Director of Communications, Director of Facilities, (and) Director of Finance.”

A former School District Superintendent stated: “I evaluated employees at all levels of the organization, (and) always considered (the) impact of their performance on the overall success of the organization's mission. How students performed in a particular classroom, student safety, respect for students and colleagues, demeanor in stressful situations, interactions with parents, (the) public, and others within the organization, etc.”

A former School District Superintendent and Assistant Superintendent stated: “Teacher evaluation is conducted by the principal of each building level: elementary, middle school, and high school. Principals are evaluated by the superintendent and assistant superintendent. Teachers are evaluated by the principal and the department chairperson (in larger school districts). Frequently a rating scale is used to evaluate teachers on a 1-5 scale with 5 being excellent. A 1 rating would be unsatisfactory, requiring an improvement plan outlined by the department chairperson (department head) or principal or both. Some rating categories may include: preparation, knowledge of subject, student interaction (engagement), teaching strategies, class control, student performance on meeting district curriculum goals and objectives, standardized test results (if applicable). Unsatisfactory ratings may include additional observations by another administrator. From my personal experience working with other administrators, there was a wide range of thinking regarding teacher performance.”

A former Assistant High School Principal stated: “I was usually tasked to do the annual evaluations of our paraprofessional staff members. In each of the settings in which I

worked, there was a rating form that had been developed over time and that was used as the basis for evaluations."

Personnel Disciplinary Decisions

RQ1c: In the domain of personnel management, what specific types of decisions do K-12 public education administrators make about people in **disciplinary action?**

Summary of Collaborative and Policy Oriented Contexts for Personnel Disciplinary Decisions

The qualitative data suggests that for personnel disciplinary action decisions, school principals and school district superintendents work collaboratively with fellow administrators and the school district solicitor, in addition to adhering to procedures as set in policy (Table 3). Most study participants commented that the disciplinary process involved multiple administrators and other individuals during investigative fact-finding. Further, when disciplinary action rises to the potential for legal action, school administrators work in tandem with the school district solicitor, and often the final decision is reserved for the superintendent and the school board. The investigation process entails fact-finding actions such as interviewing the relevant parties, gathering supporting documentation, and asking for observational input from supervisory personnel. Once all facts are gathered, the administrator must follow school district policy and state education policy, in addition to the collective bargaining agreement for faculty and staff. As several study participants noted, levels of disciplinary action often include stepwise actions, such as verbal warnings, written warnings, paid or unpaid leave of absence, board hearings, and dismissal. Criminal charges incurred due to an employee's actions outside a school setting may also result in disciplinary action. This qualitative evidence informed the quantitative data collection instrument, such that an anchoring bias decision scenario was formulated to

include information that centered on input from others about a disciplinary action policy related to length of teacher suspension, in this case input from the school board. Qualitative study data in total evidenced that participants mentioned *school board* more than 40 times regarding its governance and decision-making powers over the school district. Therefore, one of the anchoring bias decision scenarios referenced pressure from the school board to tighten the leave of absence policy for teacher suspension after recently publicized educator misconduct toward students in the school district. The anchoring bias statement included the typical number of days for teacher suspension at either a high anchoring (30 days) or low anchoring (3 days) extreme value, which served to, respectively, inflate or deflate the minimum number of days that quantitative study participants would set for the teacher suspension policy.

Table 3. Personnel Disciplinary Action Decisions: Qualitative Data Analysis Results

Raw Data	Frequency	Decision Context Code
Principal's initial investigation involved interviewing witnesses	3	Collaborative
Principal presented disciplinary action recommendation to central office administrators	1	Collaborative
For serious matters, outside counsel represented district vs. union represented individual	1	Collaborative
School district solicitor consulted	3	Collaborative
Final decisions made by Superintendent and school board	3	Collaborative
Superintendent reviewed collective bargaining agreement, school board policy, and public school code as needed	3	Policy Oriented
Supt. and Asst. Supt. followed disciplinary protocol	2	Policy Oriented
TOTAL	**11 Collaborative 5 Policy Oriented**	**Highly Collaborative + Moderately Policy Oriented**

Critical Data from Qualitative Study Participants about Personnel Disciplinary Decisions

A former High School Principal stated: "I was responsible for disciplinary actions involving every individual who worked in the building. Once I received ... a report (of misconduct), I gathered as much relevant information as possible by interviewing individuals who had first-hand knowledge of the situation and by examining any materials that may have been of evidentiary value. After completing the initial investigation and informing the appropriate individuals in central administration, I confronted the individual who was the subject of the report to inform them of the information I had received and asked them to give their side of the story. ... If, after the discussion with the individual, I determined that disciplinary action was in order, I would meet with the appropriate central office administrators to lay out the case and make my recommendation for an appropriate action. If the action was of a serious nature ... a formal process was usually begun involving an outside counsel representing the school district and a union representative on behalf of the individual. … Final decisions in serious matters were left to the superintendent and school board."

A former School District Superintendent stated: "Discipline of administrators, faculty, and students was one of my responsibilities. … Evidence included official investigation of allegations, supporting documentation and testimony, job descriptions, personal observations, observations by other supervisory personnel, etc."

A former School District Superintendent stated: "Difficult decisions (about disciplinary action) were made at every level including recommending termination. … (It) was extremely important to review the collective bargaining agreement, school board policies and school code as the situation warranted. Often, the school district solicitor was contacted to

provide advice and counsel. … Levels of action included verbal warnings, written warning(s), time off with or without compensation, board hearings and dismissal."

A former School District Superintendent and Assistant Superintendent stated: "Disciplinary decision-making included: Preventative measures: School administrators and program supervisors need to be trained in recognizing early warning signs of behavior that may lead to initiating disciplinary action. Resources: A copy of the PA School Code, School Law Manual, District Policy Manual, Collective Bargaining Agreements with each employment group and the district solicitor on speed-dial are essential. Follow(ing) the procedure that applies to the particular situation to the letter. Work(ing) with your solicitor to convince hard line board members that circumventing or ignoring 'dumb' requirements will more than likely backfire."

A former School District Superintendent stated: "I also processed all legal issues such as non-renewals, dismissals, furloughs etc. and always through consultations with the school solicitor. Interestingly, if you put in place systemic changes with data driven decision making as mentioned (earlier), discipline issues are reduced because the focus is now on helping everyone do better. ... Systemic evaluation procedures help determine commonly understood criteria, objective collection of data, improvement efforts and continual monitoring that provide for a sometimes long process, but one that either improves instruction and student performance or results in provable reasons for dismissal."

A former School District Superintendent stated: "I took disciplinary actions on all the people whom I evaluated or helped evaluate - when necessary. I always interviewed all pertinent parties to the disciplinary issue, evaluated the information gathered, and made a decision based on what was fair, and in the best interests of our students and the administrative staff members who were watching the issue with great interest and concern."

A former School District Superintendent, Assistant Superintendent, and High School Principal stated: "Any disciplinary action requires written documentation of the deficiency or incident that are school based. Disciplinary action can also be taken based on criminal charges incurred due to an educator's actions outside of school duties. Departmental Supervisor - Written documentation of incident. Principal - Review of written documentation and disciplinary action for employee. Superintendent - action and/or recommendation to (State) Board of Education. Actions include verbal or written reprimand, suspension with or without pay. Non-tenured - termination of employment. Tenured - tenure charges based on inefficiency, incapacity or conduct unbecoming resulting in withholding increment or termination. Criminal charges need disposition of charges before action is taken."

Other Personnel Management Decisions

RQ1d: In the domain of personnel management, what specific types of decisions do K-12 public education administrators make **apart from those mentioned above?**

Summary of Contexts for Other Personnel Management Decisions

In the qualitative study, this open-ended interview question elicited useful information related to personnel management decisions (Table 4). Of note, one study participant discussed how employing a transparent, collaborative decision-making process aids in difficult decisions, for instance, when deciding which programs to cut from the school district budget when government funding is suddenly cut. According to several study participants, personnel management entails informal decisions and behaviors on the part of K-12 public school administrators, such as soliciting a wide variety of input early in a decision process to create buy-in. In addition, personnel management entails formal decisions and actions that include

reorganizing or restructuring the school district due to budget cuts; promoting faculty and administrators; approving time off; and overseeing special programs.

Table 4. Other Personnel Management Decisions: Qualitative Data Analysis Results

Raw Data	Frequency	Decision Context Code
Superintendent (Supt.): Administrative and organizational restructuring	2	Collaborative
Supt.: Mediation of disputes	1	Collaborative
Supt.: Employee schedule, benefits, requests, promotions, etc.	2	In Isolation
Supt.: Train administrators and program supervisors	2	Collaborative
Supt.: Budget / Staff reduction	2	Collaborative
Supt.: Use "collaborative decision-making models" in transparent process to determine fair budget cuts	1	Collaborative
Supt.: Solicit wide variety of input early in decision process to create buy-in	1	Collaborative
Principal: Less serious personnel behavior problems resolved by meeting with individual, progressing to involvement of Asst. Principal if needed – with goal of helping individual resolve problem together	1	Collaborative
TOTAL	**10 Collaborative 2 In Isolation**	**Highly Collaborative**

This qualitative evidence informed the quantitative data collection instrument, such that attribute framing bias decision scenarios were formulated to include a biasing statement that centered on input from others. Specifically, one of the attribute framing bias decision scenarios contained a biasing statement that referenced either a positively framed approval rating (72% agree) or negatively framed approval rating (28% disagree) for the decision to cut the school district's music program due to education budget cuts imposed by the governor. The positively framed approval rating served to inflate the propensity for study participants to agree to the policy decision, whereas the negatively framed approval rating served to deflate the propensity for quantitative study participants to agree to the policy decision. This decision scenario was

created also in light of qualitative evidence about budget policy decisions, as noted in *Budgeting Decisions* under the *Organizational Policymaking Decision Domains* section below.

Critical Data from Qualitative Study Participants about Other Personnel Management Decisions

A former School District Superintendent stated: "In general, the other major personnel decision I would make had to do with any reorganization or administrative restructuring that happened throughout the school district. Any structural changes began and ended with my office."

A former School District Superintendent stated: "Other personnel management decisions included: promotion, change of assignment, requests for leaves or time off with and without pay, special programs, visitor requests, environmental requests due to health and safety issues, scheduling assignments and adjustments and intervening in disagreements involving staff, students, parents, board members, or the community-at-large."

A former School District Superintendent stated: "Other personnel management decision included the areas of: Work Climate: Providing training for building administrators and program supervisors on practices and strategies that promote a healthy and productive work environment. Visibility: The superintendent needs to create and take opportunities to visit workplaces and interact with employees in all sectors of district operations. Socialization: Providing opportunities for staff to gather in a strictly social setting helps develop a human perspective of the overall mission of the organization."

A former School District Superintendent stated: "It has been necessary to reduce staff twice in my 29 years as a Superintendent. First, because the district reorganized and needed less staff. The second, the state governor took $4,000,000 of 'excess' money from our budget causing

a reduction in programs and staff. What and who gets cut. Ask 10 people and you get 10 answers. It was my responsibility to determine how to process as 'fairly' as possible. Again, using collaborative decision-making models in a fully open process produced the needed list of cuts for Board approval."

Organizational Policymaking Decision Domains

Personnel Policy Decisions

RQ2a: In the domain of organizational policymaking, what specific types of decisions do K-12 public education administrators make about **personnel policies**?

Summary of Collaborative Contexts for Personnel Policy Decisions

The qualitative data suggests that for personnel policy decisions, school district superintendents work collaboratively with fellow administrators, and the faculty and staff who are impacted by these policies (Table 5). Importantly, the crux of organizational policymaking in K-12 public education lies in the administrators' work with the school board. In Pennsylvania, the school board is a seven- to 15-member legislative body that establishes policy that school district administrators must carry out (Pennsylvania School Boards Association, 2023). To facilitate policymaking, school district superintendents or their designees are responsible for gathering input and evidence to propose new policy or changes to existing policy to the school board. Personnel policy decisions can involve staff evaluations; contract negotiations; hiring and promotion practices; appropriate conduct with students; ethical communications and technology use; and standards for faculty and staff compensation.

This qualitative evidence informed the quantitative data collection instrument, such that an anchoring bias decision scenario centered on a personnel policy decision with input from

others. Specifically, one of the anchoring bias decision scenarios elicited a policy preference for the maximum number of days that faculty and staff have to respond to external communications.

The decision scenario included a biasing statement that referenced complaints lodged by prominent community members about the slow response by district staff to emails and phone calls. The anchoring bias statement cited how many hours that school districts in the state typically require for this personnel policy, either at a high anchoring (72 hours) or low anchoring (12 hours) extreme value. This served to, respectively, inflate or deflate the maximum number of days that quantitative study participants would require faculty and staff to respond to emails and phone calls.

Table 5. Personnel Policymaking: Qualitative Data Analysis Results.

Raw Data	Frequency	Decision Context Code
Superintendent (Supt.): "The board makes policy" … it's my job to implement board's vision in practice.	2	Collaborative
Need board approval for any policy decision.	3	Collaborative
Help Board Policy Committee to make policy recommendation to entire board.	1	Collaborative
"Policy manual is a living document."	1	Policy Oriented
"I believe in collaborative decisions."	1	Collaborative
Solicits input from personnel affected by policy change before recommending change	2	Collaborative
Policy committee comprised of board members, district- and building-level administrators.	2	Collaborative
Supt. develops proposal for policy change to board.	2	Collaborative
Worked with faculty union leadership on organizational policy establishing teacher coursework standards	1	Collaborative
TOTAL	**14 Collaborative 1 Policy Oriented**	**Highly Collaborative**

Critical Data from Qualitative Study Participants about Personnel Policy Decisions

A former School District Superintendent stated: "The Board makes policy - it is my job as superintendent to make certain that the Board's vision is implemented in practice."

A former School District Superintendent stated: "It is important to remember that any administrator works for a Board and that any policy decision is theirs to make. You might have the best idea ever, but you need their approval. I view a policy manual as a living document that is always changing. It is an administrator's friend, if it is up to date. My job was to make recommendations for policy changes to a Board Policy Committee and help them come to a recommendation for the entire board. Again, I believe in collaborative decisions, so stakeholders need to be involved in developing a draft for the committee to review and discuss. Major policy decisions have involved staff evaluations, contract negotiations and the results thereof, hiring practices, appropriate conduct with students, use of electronic communications and the internet."

A former School District Superintendent stated: "For existing policy and proposal of new policy, the District Policy Manual is the document that provides direction for the operation of district programs and services, and direction for dealing with problems that may occur. It is highly recommended that a policy committee comprised of representatives from the school board and district and building level administrators be established and convene on a periodic basis to review sections and/or selected policies. It is also considered good practice when staff affected by policies under review be included. The review may lead to recommendations for modifying procedures, updating language or making substantive changes to policies. The superintendent is then responsible for developing a proposal for formal board consideration for change."

A former School District Superintendent stated: "I was responsible for developing guidelines to ensure consistent implementation throughout the organization such as salary levels,

requirements for promotion, standards of behavior, attendance requirements, staff development expectations."

A former Assistant School District Superintendent stated: "I was responsible for curriculum and instruction, presented all policy recommendations for secondary education in the district."

A former Assistant School District Superintendent stated: "One of my responsibilities was approving reimbursements for graduate credits that would affect teacher compensation based on the salary scale. After seeing a number of such requests for reimbursement from out of state online provider that I was unfamiliar with, I contacted the provider to question the rigor of the course work. When I learned that there was scant accountability for student work, I approached the union leadership to share my concerns. With their concurrence, I published a letter to the staff, indicating that all future requests for pre-approval for graduate courses from this particular provider would be denied."

Student Policy Decisions

RQ2b: In the domain of organizational policymaking, what specific types of decisions do public education administrators make about **student policies**?

Summary of Collaborative Contexts in which Student Policy Decisions Are Made

The qualitative data suggests that for student policy decisions, school district superintendents work collaboratively with the school board, fellow administrators, and faculty and staff to develop and revise student policies (Table 6). Student policies encompass a large portion of any school district policy manual, where one study participant noted there were 270 student policies in the policy manual for the school district where he worked. As noted by most study participants, the school board plays a central role in policymaking. As multiple study

participants noted, policy committees are often formed to oversee development and implementation of student policies, to ensure that policies are in the best interest of all students and can be enforced fairly and consistently. Student policy areas include discipline, attendance, harassment, graduation, dress code, drug and alcohol use, school and extracurricular activity codes of conduct. This qualitative evidence informed the quantitative data collection instrument, such that an attribute framing decision scenario centered on a student policy decision with input from others.

Table 6. Student Policymaking: Qualitative Data Analysis Results.

Raw Data	Frequency	Decision Context Code
Student policies comprise one of largest, most comprehensive sections of district policy manual.	1	Policy Oriented
Student policies are most often reviewed policy type. Reviewed by committees per policy area: safety, disciplinary, etc.	2	Collaborative
Student policies should be in best interest of all students and fairly, consisted enforceable.	2	Policy Oriented
Principal provides oversight of student handbook development, works with faculty and assistant principals.	1	Collaborative
Need board approval for any policy decision.	3	Collaborative
Strict drug and alcohol policy implemented top down by superintendent and school board.	1	Collaborative
High School Principal formed committee of veteran teachers and guidance counselors to revise Honor Society standards.	1	Collaborative
TOTAL	**8 Collaborative 3 Policy Oriented**	**Highly Collaborative + Somewhat Policy Oriented**

As mentioned for anchoring bias decision scenario #2 (personnel discipline policy), qualitative study data in total evidenced that participants mentioned *school board* more than 40 times regarding its governance and decision-making powers over respective school districts.

Therefore, one of the attribute framing bias decision scenarios elicited the propensity to support a student policy that would alleviate the district's student meal budget shortfall by requiring cafeteria workers to serve cheaper meals to students whose families have meal debt. The decision scenario included a biasing statement that cited how many school board members either agreed with or disagreed with the policy proposal.

The positively framed statement (6 of 9 board members agree) served to inflate the propensity for study participants to agree to the policy solution in question, whereas the negatively framed statement (3 of 9 board members disagree) served to deflate the propensity for quantitative study participants to agree to the policy solution.

Critical Data from Qualitative Study Participants about Student Policy Decisions

A former School District Superintendent stated: "It would be hard to imagine that a section dealing with Students/Pupils in any District Policy Manual would not be one of the two largest and most comprehensive in that document. My former school district manual included 270 student related policies including admission, attendance, withdrawal, graduation, medication, general welfare, discipline, rights and responsibilities, extracurricular participation, etc. It is also easy to imagine that this section received the most activity in the application, review and revision. The most important consideration in the development and application of all policies in this section is that which is in the best interest of all students."

A former School District Superintendent stated: "I solicited input from assistant principals and faculty to review student policies, to ensure that said policies were fair and enforceable. Student policies ranged from issues related to conduct, safety, discipline, attendance, curriculum, activities, (etc.)."

A former High School Principal stated: "As a new principal at a high performing suburban high school, I was tasked with rewriting the selection process for the high school's National Honor Society. The previous year's selection process was widely criticized by parents in the community and the superintendent and school board had made this a high priority. After reviewing the current policy and procedures and reviewing the national guidelines, I formed a committee of veteran teachers and guidance counselors to review the perceived flaws in the current policy."

A former School District Superintendent stated: "I would always play a major role in policy development for students and staff - including policies dealing with drug and alcohol use; student … safety policies; busing policies; student … disciplinary policies; and athletic codes of conduct and policies covering all student activities, like field trips, testing practices, grading policies and class rank practices; student reorganization when school district redistricting needed to occur; etc."

A former School District Superintendent and High School Principal stated: "Summary [of student policies] is usually provided in the Student Handbook which include, attendance, use of medication, dress code, harassment, weapon, etc. [The] principal provided oversight to the development of the handbook, dissemination and implementation of policies. A basic tenant (sic) was that you do not have policies that can't be enforced in a fair and consistent manner."

A former School District Superintendent stated: "I was responsible for decisions about student policies in areas of "student driving, code of conduct, absentees, qualifications for prom, school trips, weapons, drugs and ill legal substances, and extracurricular activities, etc."

Curricular Policy Decisions

RQ2c: In the domain of organizational policymaking, what specific types of decisions do K-12 public education administrators make about **curricular policies?**

Summary of Collaborative Contexts in which Curricular Policies Are Made

The qualitative data suggests that for curricular policy decisions, superintendents and assistant superintendents work collaboratively with faculty, fellow administrators, school board members, and/or external consultants in the form of committees (Table 7). As noted by all study participants, the school board plays a central role in policymaking. As most study participants noted, curricular policy decisions are the result of long-term efforts that involve many sources of input who collaborate along the way. As several study participants noted, curricular policy decisions involve grading, class size, course offerings, ability groupings, curriculum development, and assessment content and procedures.

This qualitative evidence informed the quantitative data collection instrument, such that an attribute framing bias decision scenario centered on a curricular policy decision in a committee context. Specifically, one of the attribute framing decision scenarios elicited a propensity to support a policy for a particular student-teacher ratio in a 3rd-grade classroom. The decision scenario referenced research that validates a 16:1 student-teacher ratio based on several key student outcomes. The decision scenario contained a biasing statement that cited how many committee members either agreed with (positive framing) or disagreed with (negative framing) the policy decision. The positively framed statement (4 of 6 committee members agree) served to inflate the propensity for study participants to support the curricular policy, whereas the negatively framed statement (2 of 6 committee members disagree) served to deflate the propensity for quantitative study participants to support the curricular policy.

Table 7. Curricular Policymaking: Qualitative Data Analysis Results.

Raw Data	Frequency	Decision Context Code
Asst. Superintendent worked closely with Director of Elementary Education on K-12 curriculum development.	1	Collaborative
Superintendent (Supt.) involved several trusted colleagues and consultants to develop curriculum.	1	Collaborative
Asst. Supt. formed committee of school board members, district- and building-level administrators to review all aspects of curriculum and its impact.	1	Collaborative
Asst. Supt. suggested visiting schools that have implemented curricular program of interest.	1	Collaborative
School board makes final decision on curriculum.	1	Collaborative
Asst. Supt. for Curriculum and Instruction led teams of teachers and administrators at each school level to develop new K-12 curriculum.	1	Collaborative
State standards used as guides for curricular development.	1	Policy Oriented
Asst. Supt. for Curriculum and Instruction implemented new instructional model with outside consultation providing professional development. Professional Development Committee met on quarterly basis to monitor implementation progress.	1	Collaborative
Junior High School coordinated consolidation of two junior high schools, with team of teachers and parents researching and developing middle school model over two years. Then proposed new model to school board for approval.	1	Collaborative
TOTAL	**8 Collaborative 1 Policy Oriented**	**Highly Collaborative**

Critical Data from Qualitative Study Participants about Curricular Policy Decisions

A former Assistant School District Superintendent stated: "All curricular decisions for secondary education were in my area of responsibility. [I] worked closely with the Director of Elementary Education to ensure a seamless curriculum K-12."

A former School District Superintendent stated: "Curricular policies include curriculum development and approval, class size, course offerings and changes, assessment

procedures for students and curriculum, grading, student management systems, [and] parent access to student information."

A former School District Superintendent stated: "What to include and what to exclude was always a challenge in that there are only so many hours in each school day. It was always difficult to make curricular changes, because some member of the school community was always negatively impacted. I found that the most effective process to make these decisions was to include a number of trusted colleagues or consultants."

A former Assistant School District Superintendent stated: "Curriculum development and supervision were my primary responsibilities. ... Once a viable proposal is prepared, a committee comprised of representatives from the school board and district and building level administrators [convenes] to address issues regarding applicability, impact on other programs and schedules, professional development and affordability of the plan. If at all possible, visiting schools that implemented the program is extremely helpful. Once all the pieces are in place, the proposal can be presented to the full board for consideration. K-12 curriculum scope and sequence design."

A former Assistant School District Superintendent for Curriculum and Instruction stated: "I led a K-12 curriculum scope and sequence design. This was a four-year project as it was highly time-consuming, because teachers and administrators on each committee had full-time responsibilities as well. The purpose of the project was to design a logical sequenced set of goals and objectives for each curriculum that would replace the current disjointed approach. … Committees were set up to include grade level teachers at the elementary levels, whereas at the middle school and high school levels subject area teachers composed each committee. School board approval was needed to begin the project. State standards for knowledge and skills in each

curriculum area were used as guides. Included were recommendations from national educational organizations."

A former Assistant School District Superintendent for Curriculum and Instruction stated: "I was responsible for implementing a district wide Differentiated Instruction Model in our four elementary schools as well as our middle and high schools. Working with one of our elementary principals who was very well versed in the concept, as well as our district Professional Development Committee, which included teacher representatives from each of our six buildings, we developed a plan to make differentiated instruction the focus of instruction in all of our classrooms. We contracted with an outside consultant to provide professional development on a released time basis over a three-year period to every teacher in our district. We recruited the first cohort of teachers from among those who were most interested in implementing the model. The Professional Development Committee met on a quarterly basis to monitor the progress of the implementation."

A former Junior High School Principal stated: "I was charged with combining (two junior high school) each serving different areas of the ... District. A team of teachers and parents studied the educational and developmental benefits of the middle school approach versus the traditional junior high school. The team researched the literature on middle school structure, curriculum design, teaching approaches, and related issues for the age group. The review and study were accomplished over two years then presented to the board of directors."

A former High School Principal stated: "I (used) [a] Strategic Planning Model to establish mission, set priorities, allocate resources and evaluate the effectiveness of the plan. As principal, [I] implemented a wide range of curriculum decisions including ability grouping

policies, increasing advanced placement opportunities, integrated discipline, Project Based Activities and Design of the school day for instruction."

Budgeting Decisions

RQ2d: In the domain of organizational policymaking, what specific types of decisions do K-12 public education administrators make about **budgeting (de facto policymaking)?**

Summary of Collaborative Contexts in which Budgeting Policy Decisions Are Made

The qualitative data suggests that for budgeting decisions, school district superintendents work collaboratively with business managers, school principals work collaboratively with department supervisors, and various administrators work with school board budget committees (Table 8). Almost all policy decisions hinge on budgeting constraints, and school district budgets are dependent on the governor's executive budget allocations and the state's funding formula which dictates the proportion of government funding sources. On the school district level, budgeting decisions are based on the school district strategic plan co-developed and approved by the school board. As noted by most study participants, all decisions have budgeting implications that require school board approval. Budgeting decisions primarily involve salaries, benefits, and debt services, where one study participant estimated that these elements comprised about 80% of the school district budget. The superintendent, assistant superintendent, and/or business manager consider inclusion of budget requests from school principals and department supervisors.

This qualitative evidence informed the quantitative data collection instrument, such that an attribute framing bias decision scenario centered on a budgeting decision to cut a particular program. Specifically, one of the attribute framing decision scenarios elicited a propensity to recommend that the music program be eliminated due to the governor's education budget cuts.

The decision scenario contained a biasing statement which cited a percentage that internal and external stakeholders either agreed or disagreed with the budgeting policy decision. The positively framed statement (72% agree) served to inflate the propensity for quantitative study participants to support the policy decision, whereas the negatively framed statement (28% disagree) served to deflate the propensity for study participants to support the policy decision.

Table 8. Budget Policymaking: Qualitative Data Analysis Results.

Raw Data	Frequency	Decision Context Code
"Every budget decision affects another area of the organization." / Ensure overall district operations share in budget adjustments.	2	Collaborative
Principals and area supervisors proposed budget each year. Then, Superintendent (Supt.), business manager, and Asst. Supt. review draft with each person.	4	Collaborative
Continual meetings with staff leaders and School Board Budget Committee for weeks to negotiate and modify budget proposal.	1	Collaborative
Supt. presented district budget to board. Drafting and revising occurs several more times.	1	Collaborative
Supt. met with business manager to review final budget draft for accuracy and compliance with state rules and guidelines.	1	Collaborative / Policy Oriented
A cooperative relationship between Supt. and business manager is preferred over divided or supervisory relationship.	2	Collaborative
Budget is developed in accordance with strategic plan established by board.	1	Collaborative
Principal met with department chairs to decide how to reallocate funds for ad hoc budget needs.	1	Collaborative
Principal: Budget discussions with staff were usually collegial.	1	Collaborative
TOTAL	**14 Collaborative 1 Policy Oriented**	**Highly Collaborative**

Critical Data from Qualitative Study Participants about Budgeting Policy Decisions

A former School District Superintendent stated: "Budgeting decisions are (difficult) but very important decisions, always constrained by budgetary limitations. Again, the variables are many and every decision effects (sic) another area of the organization. In public schools, there is a constant discussion about required vs. elective academics, boys vs. girls athletics, salary adjustments, and a constant sensitivity to the community's ability to pay taxes."

A current School District Superintendent stated: "Two or three months following the start of the current school year, building principals and service area supervisors are asked to begin the process of preparing a budget for the following school year. Several weeks later, the business manager, assistant superintendent and I meet with each of them to review their initial drafts. Keeping in mind that salaries, benefits and debt services can make up about 80% of the total budget, the business manager tries to squeeze in the proposals submitted by principals and supervisors. Meetings with staff leaders and the school board budget committee continue for several weeks. Following a number of adjustments and modifications, an initial draft of the following year's budget is presented to the full board. More than likely that draft will require the steps of that process to be repeated several times."

A former School District Superintendent stated: "Each department in the school was responsible for developing a budget, submitted to the principal and then forwarded to the Business Administrator and Superintendent with priority recommendations. School-wide items like transportation or capital improvements were developed by the Business Administrator."

A former School District Superintendent stated that: "For a superintendent, the yearly budget presented to the board of directors is a key event supporting the entire school district operations; administration, teaching and learning, professional personnel, support services,

transportation, food services. … My directive to building principals, supervisors, directors, and department heads was to submit their budgets in late spring with justifications for each area of increase or decrease. Too, they should gather information and recommendations from subordinates. I then met with each person in charge to hash out the final proposal. It was a give and take discussion with frequent compromise. Finally, I met with the Business Manager to review accuracy and compliance with [Pennsylvania] state rules and guidelines."

A former School District Superintendent stated: "The most important decision in budgeting is establishing a working relationship and procedures with the Business Manager. Some organizations have a clear division between the Business Manager and the Superintendent. In others, the Superintendent supervises the Business Manager. This relationship is best when both works cooperatively in developing a budget that addresses goals established by the Board. and other initiatives established by Long Range Plans."

A former High School Principal stated: "I was able to provide input into the annual district budget process based upon the anticipated needs of the school. When the final district budget was approved, monies were allocated to the high school with a certain amount designated for each curricular area. During the school year, as funds were expended, unanticipated needs would arise. An example would be increased enrollment in a class during the second semester requiring that additional textbooks and supplies be purchased. If the department requiring the additional resources did not have sufficient funds in their budget, during our regularly scheduled department chair meetings, we would discuss reallocating funds from a different department to meet the unanticipated need. This was usually accomplished in a collegial manner, but in a rare instance I was forced to make an executive decision, which I quickly did."

Other Organizational Policymaking Decisions

RQ2e: In the domain of organizational policymaking, what specific types of decisions do K-12 public education administrators make **apart from those mentioned above?**

Summary of Collaborative Contexts in which Other Organizational Policy Decisions Are Made

In the qualitative interview survey, this research question elicited useful information related to organizational policymaking decisions, which are often made collaboratively (Table 9).

Table 9. Other Organizational Policymaking: Qualitative Data Analysis Results.

Raw Data	Frequency	Decision Context Code
Inclusion of stakeholders in policymaking is of utmost importance, but it rarely happens.	1	Somewhat Collaborative
Superintendent's (Supt.) input was solicited by board and leadership.	1	Collaborative
District policymaking involved Supt. and school board working as team of 10 people.	1	Collaborative
Supt.: "Every decision must be considered for its budget implications."	1	Policy Oriented + Collaborative
Supt. and business manager should work collaboratively.	1	Collaborative
Asst. Supt. developed new management structure with input from management personnel.	1	Collaborative
Supt. shared new management structure (mentioned above) to management personnel, then submitted to school board due to proposed reclassification of positions.	1	Collaborative
School board makes final decision on adoption of new policies and revision of existing policies.	1	Collaborative
Collaborative relationship between Supt. and school board is crucial to policymaking process.	1	Collaborative
The school board governs, while the Supt. manages. Ideal relationship is collaborative, not adversarial.	1	Collaborative
TOTAL	**9 Collaborative 1 Policy Oriented**	**Highly Collaborative**

Of significance, most study participants noted that the school board is the ultimate policymaking body. Several participants noted that all decisions have budgeting implications, and that decision-making best practices are to include stakeholders in the policymaking process. Another noteworthy point, as mentioned by one study participant, was that board members sometimes overreach by micromanaging decisions which are the school district administrators' purview. This could be mitigated by training board members in the scope of their roles and responsibilities, and in the working relationship with the superintendent. Establishing a positive working relationship between the superintendent, whose role is to manage, and the school board, whose role is to govern, will then create a collaborative atmosphere.

Critical Data from Qualitative Study Participants about Other Organizational Policy Decisions

A former School District Superintendent stated: "(Policy) - in general - is often overlooked by leaders as boring. The reality is that policy helps to set culture and climate. Inclusion of stakeholders in policy making - and taking your time to discuss in public - is of the utmost importance. But it rarely happens."

A former School District Superintendent stated: "Other organizational policymaking decisions involved transportation, food service, signage, awards, recognition celebrations, driving, parking, internal and external communications."

A former School District Superintendent stated: "I (participated) in discussions of all organizational policymaking. My input was solicited by board and leadership."

A former School District Superintendent stated: "All school district policies were always the proper domain of the Superintendent and the [School] Board working as a team of ten people focused on the school district's ... Strategic Plan."

A former School District Superintendent stated: "Every decision must be considered for its budget implications. The one that comes up every year is when can or should you transfer money. A budget is just a guide that can change but Board approval is necessary. [The] business Manager and Superintendent should work collaboratively with others using skills described above. And, sometimes stuff happens such as a leak in the gym, water main break, or air conditioning goes out, or the governor takes $4 million dollars from your budget. My decision making at such times was to make sure all aspects of district operations shared in the adjustments."

A former Assistant School District Superintendent stated: "As an interim assistant superintendent, serving a newly hired superintendent, I was asked to help develop a new management structure for the district central office administrative staff. Using the existing structure as a template, I observed the operation during my first three months in the position. I interviewed all of the individuals in the current positions and asked them what they would do differently and what an ideal organizational structure would look like to them. I then drafted a proposed organizational restructure and shared it with the entire central office staff and asked for their feedback. Once I had made a few minor changes based on this feedback, I presented it to the superintendent, who shared it with the central office staff during an off-site meeting. Because the new structure involved reclassifying positions, the superintendent was required to submit it to the school board for their approval. Because of budgetary considerations, only two of the proposed changes were approved."

A former School District Superintendent commented on school board relations, stating that: "Local school boards have the final say in adopting new and revising existing policies. A collaborative relationship between a superintendent and his/her board is a major

factor in this process. An obstacle to achieving this level of cooperation is a common misconception of the roles and responsibilities of board members. Simply stated, the board as a body governs while the superintendent manages. Board members engaging in micromanagement can create an unproductive work climate for both parties. Two strategies I employed to help minimize this threat from occurring were: 1. Accompanying newly elected board members to workshops dedicated to defining Roles, Responsibilities and Relationships (3Rs) of board members and school district management team. 2. Getting the board to agree to Saturday morning sessions, held on a quarterly basis, to assess how well we were adhering to the key elements of the 3Rs model."

A former School District Superintendent commented on community outreach, stating that: "Occasionally, a proposal for a new policy or a policy related incident initiates a level of concern within the community. Scheduling, advertising, and conducting a 'town hall' meeting is essential. Addressing the situation can be stressful, but avoiding or ignoring it could easily lead to a loss of credibility."

A former High School Principal and School District Superintendent stated: "I developed strategies for faculty and students to foster a positive school climate, … [and] developed Crisis Management Plans including training for staff and students. This is essential since any policy can be significantly altered in a crisis situation, i.e., Covid 19 impact on school policy and procedures for the past 2 years."

Quantitative Study Results

This sub-chapter reports on the analyses of data obtained from quantitative study participants—currently practicing K-12 public education administrators—in answer to multiple overarching research questions. The research questions and hypotheses centered on three aspects

of cognitive bias: (1) the influences of attribute framing bias and anchoring bias on decision-making, as observed in the control groups; (2) the mitigation effectiveness of a consider-the-opposite debiasing intervention, as observed in the control and intervention groups; and (3) the quality of consider-the-opposite feedback and its relationship to debiasing mitigation, as observed in the intervention groups.

Descriptive Findings

Descriptive findings are shown in Table 10. The quantitative study sample included 300 total participants. There were 178 participants in the control group and 122 participants in the intervention group. A quasi-experimental research design was employed, because quantitative data was collected via the internet and under sub-optimal conditions as the COVID-19 pandemic was peaking in early 2022 and stirring up vehement political pressure on K-12 public school administrators in Pennsylvania. The quasi-experimental design entailed data collection utilizing three separate survey-in-the-field versions, each tailored for one of three strands of study participant groups: (1) anchoring bias and attribute framing bias control group, who responded to all six decision scenarios (N = 178); (2) anchoring bias intervention group, who responded to the three anchoring bias decision scenarios and provided consider-the-opposite feedback on each scenario response (N = 61); and (3) attribute bias intervention group, who responded to the three attribute framing decision scenarios and provided consider-the-opposite feedback on each scenario response (N = 61). In conclusion, the **study sample (N) total was 300**, and included:

- 178 participants in the Control Group (Strand 1),
- 61 participants in the Anchoring Bias Intervention Group (Strand 2), and
- 61 participants in the Attribute Framing Bias Intervention Group (Strand 3).

Table 10. Descriptive Statistics for K-12 Public Education Administrators.

Variable	N	Percent or Mean (SD)
Current Position (Overall Sample)		
Superintendent	65	22.0
Assistant Superintendent	58	19.0
Principal	126	42.0
Assistant Principal	51	17.0
Years in Current Position		5.7 (3.80)
Years in K-12 Public Ed. Admin. Position(s)		14.7 (6.50)
Education Level		
Master's Degree	91	30.33
Some Doctoral Degree	73	24.33
Doctoral Degree	136	45.33
Age (years)		51.0 (7.40)
School District Size (# students)		
Up to 1,000	21	7.0
1,000-5,000	132	44.0
5,001-15,000	72	24.0
15,001-30,000	18	6.0
30,001-75,000	28	9.33
75,001 or more	29	9.67
School District Location		
Rural	58	19.33
Town / Borough	41	13.67
Suburban	141	47.0
Urban	60	20.0

Study Participant Characteristics

Table 10 outlines characteristics of the overall quantitative study sample. The sample included K-12 public school superintendents (N = 65); assistant superintendents (N = 58); principals (N = 126); and assistant principals (N = 51). Other professional and personal data were collected from study participants for potential inclusion as covariates in the multivariate analyses. This data entailed (1) years in current position (mean = 5.7 years); (2) total years in any K-12 public administration position(s) (mean = 14.7 years); (3) education level (master's degree = 91; some doctoral degree = 73; and doctoral degree = 136); age (mean = 51.0 years); and (4) school district size, parsed into six size groupings as shown in Table 10. Additionally, to assess

the equitability of quantitative survey distribution, study participants were asked for their school district location (rural = 58; town/borough = 41; suburban = 141; urban = 60). In Appendix I, a table outlines characteristics of the quantitative study sample subgroups: control group (strand one), anchoring bias intervention group (strand two), and attribute framing bias intervention group (strand three). These are discussed in Chapter V regarding the sampling procedure.

Table 11. Cognitive Bias Scales

Variable	N	Mean (SD)
Anchoring Bias – Scenario #1 (0-100 Scale)		
High Anchoring Bias - Control Group	86	86.90 (5.47)
Low Anchoring Bias - Control Group	92	75.98 (10.69)
High Anchoring Bias - Intervention Group	32	78.67 (6.39)
Low Anchoring Bias - Intervention Group	29	74.16 (5.18)
Anchoring Bias – Scenario #2 (Number of Hours)		
High Anchoring Bias - Control Group	95	41.05 (19.43)
Low Anchoring Bias - Control Group	83	23.54 (8.08)
High Anchoring Bias - Intervention Group	30	47.57 (16.03)
Low Anchoring Bias - Intervention Group	31	37.81 (15.86)
Anchoring Bias – Scenario #3 (# Days)		
High Anchoring Bias - Control Group	86	21.51 (14.40)
Low Anchoring Bias - Control Group	92	4.34 (2.72)
High Anchoring Bias - Intervention Group	31	13.06 (8.70)
Low Anchoring Bias - Intervention Group	30	6.60 (4.44)
Attribute Framing Bias – Scenario #1 (0-100 scale)		
Positive Framing Bias - Control Group	90	85.70 (8.10)
Negative Framing Bias - Control Group	88	76.70 (9.73)
Positive Framing Bias - Intervention Group	31	57.23 (21.92)
Negative Framing Bias - Intervention Group	30	51.17 (22.74)
Attribute Framing Bias – Scenario #2 (0-100 scale)		
Positive Framing Bias - Control Group	87	62.94 (22.70)
Negative Framing Bias - Control Group	91	21.16 (20.88)
Positive Framing Bias - Intervention Group	33	34.70 (19.34)
Negative Framing Bias - Intervention Group	28	33.10 (27.59)
Attribute Framing Bias – Scenario #3 (0-100 scale)		
Positive Framing Bias - Control Group	89	57.63 (27.60)
Negative Framing Bias - Control Group	89	17.63 (17.70)
Positive Framing Bias - Intervention Group	30	57.63 (27.60)
Negative Framing Bias - Intervention Group	31	40.35 (22.50)

Anchoring Bias Groups and Attribute Framing Groups - Sample Size, Response Mean, and Standard Deviation

Table 11 outlines the sample sizes, mean participant responses, and standard deviations for each of the four participant groups within each of the six decision scenarios. For the three anchoring bias decision scenarios, these four groups are high anchoring bias control, low anchoring bias control, high anchoring bias intervention, and low anchoring bias intervention. To note, sub-group sample sizes are uneven because participants in each anchoring bias control and anchoring bias intervention group were randomized in Qualtrics to either the low anchoring bias or high anchoring bias sub-group. For the three attribute framing bias scenarios, these groups are positive framing anchoring bias control, negative framing anchoring bias control, positive framing anchoring bias intervention, and negative framing anchoring bias intervention. As for anchoring bias decision scenarios, each attribute framing bias control group and attribute framing bias intervention group were randomized in Qualtrics either to the positive framing bias or negative framing bias sub-group.

Results of Statistical Analyses for Anchoring Bias Groups

Preliminary Bivariate Analysis

As displayed in Table 12, for the anchoring bias groups, a preliminary bivariate analysis was conducted to determine whether any potential covariates were significantly different among the four groups: high anchoring control, high anchoring intervention, low anchoring control, and low anchoring intervention. Three covariates were found significantly different either from a one-way ANOVA or Chi-Square analysis. Results of a one-way ANOVA indicated that, at the .05 level, age (p <.001) and *total years* in any K-12 public education administration position (p = .045) were significantly different, whereas years in current position (p = .118) was not. Results

of a Chi-Square test indicated that, at the .05 level, school district size ($p = .001$) was significantly different, whereas education level ($p = .111$) was not.

The variable of age was the only covariate selected for inclusion in the multiple regression analysis for several reasons. First, due to its significant correlation to *total years* in K-12 public education administration positions ($r = .689$, $p < .001$). Second, both age and *total years* were found to be significant in the bivariate analysis of the anchoring bias groups, where age ($p < .001$) was more statistically significant than *total years* ($p = .045$). Finally, age was also found to be statistically significant in the bivariate analysis of covariates for the attribute framing bias groups. Hence, only age was included as a covariate in the multiple regression analysis to maintain continuity of the multivariate analyses for anchoring bias and attribute framing bias.

Table 12. Characteristics of Anchoring Bias Groups, ANOVA Bivariate Analysis.

Variable	**Overall**	**HAC**	**HAI**	**LAC**	**LAI**	**χ^2 / F**	***p***
Years in Current Position	5.7	6.7	5.3	5.1	5.5	2.0	.118
Years in K-12 Public Ed. Admin. Position(s)	13.7	14.6	11.5	12.8	15.9	2.7	**.045**
Education Level (%)						10.3	.112
Master's Degree	36.0	36	36.7	41.3	19.4		
Some Doctoral Degree	25.1	18.6	36.7	23.9	35.5		
Doctoral Degree	38.9	45.4	26.7	34.8	45.2		
Age (years)	49.6	48.6	49.3	48.4	56.7	9.1	**<.001**
School District Size (%)						22.2	**.001**
Up to 5,000 students	51.9	43.0	70.0	58.7	38.7		
5,001-30,000 students	31.8	38.4	20.0	32.6	22.6		
30,001 or more students	16.3	18.6	10.0	8.7	38.7		

Note: HAC = High Anchoring Control Group; HAI = High Anchoring Intervention Group; LAC = Low Anchoring Control Group; LAI = Low Anchoring Intervention Group

Statistical Approaches to Resolve Hypotheses for Anchoring Bias Groups

Restated below are the research questions, research hypotheses, and null hypotheses that were addressed quantitatively for each of the three anchoring bias decision scenarios. Subsequently, there is a separate section for each anchoring bias decision scenario which reports on the resolution of all hypotheses. Following the narrative report are two tables (Tables 13 and 14) displaying the statistical test results for all anchoring bias decision scenarios.

Independent Samples T-Tests

Table 13 displays results of independent samples t-tests employed to resolve Hypotheses 1, 2a, and 2b.

Table 13. Anchoring Bias Between-Group Analysis, Independent Samples T-Test Results.

Between-Group Comparisons	**Mean Diff.**	***t***	***df***	***p***	***Cohen's d****	***C.I. Lower***	***C.I. Upper***
Anchoring Bias: Scenario #1 (0-100 Personnel Eval Scale)							
HAC (86.90) — LAC (75.98)	10.92	8.85	139.67	**<.001**	1.30	0.98	1.62
LAC (75.98) — LAI (74.16)	1.82	1.14	82.93	.259	.189	-0.22	0.60
HAC (86.90) — HAI (78.67)	8.23	6.94	114.00	**<.001**	1.47	1.01	1.93
Anchoring Bias: Scenario #2 (# Hours)							
HAC (41.05) — LAC (23.54)	17.51	8.02	129.09	**<.001**	1.15	0.83	1.47
LAC (23.54) — LAI (37.81)	-14.26	-4.50	35.23	**<.001**	1.28	0.83	1.72
HAC (41.05) — HAI (47.57)	-6.51	-1.84	58.30	.071	-0.35	-.761	0.07
Anchoring Bias: Scenario #3 (# Days)							
HAC (21.51) — LAC (4.34)	17.18	10.88	90.67	**<.001**	1.69	1.34	2.03
LAC (4.34) — LAI (6.60)	-2.26	2.64	36.36	**.012**	-0.70	-1.12	0.28
HAC (21.51) — HAI (13.06)	8.45	3.84	88.15	**<.001**	0.64	0.22	1.06

Note: HAC = High Anchoring Control Group; HAI = High Anchoring Intervention Group; LAC = Low Anchoring Control Group; LAI = Low Anchoring Intervention Group

Prior to conducting the independent samples t-tests for each anchoring bias decision scenario, an evaluation of assumptions was performed to ensure that this parametric test was appropriate to resolve H1, H2a, and H2b. These assumptions are: two categorical independent variables, paired observations, a dependent variable at interval level or higher, normal

distribution of the dependent variable, and a minimum of 30 cases. Another independent samples t-test assumption is the homogeneity of variance between the two groups under comparison. This assumption is evaluated directly within the t-test analysis in SPSS, which builds in a Levene's *F* Test for Equality of Variances. When the homogeneity of variance assumption was violated (i.e., $p < 0.05$), the resultant t-test *p* value for the between-groups means comparison was interpreted accordingly. This violation occurred for most anchoring bias group comparisons, which is indicated where the degrees of freedom (*df*) statistic is not a whole number (Table 13).

Multiple Regression Modeling

Table 14 displays results of multiple regression modeling employed to resolve Hypotheses 3a and 3b. Prior to conducting the multiple regression analysis for each anchoring bias decision scenario, an evaluation of assumptions was performed to ensure that this parametric test was appropriate to resolve H3a and H3b. These assumptions are: a dependent variable at interval level or higher, *or* a dependent variable at categorical or ordinal level coded into a binary dummy variable; normal distribution of the dependent variable; linearity between the independent and dependent variables; homoscedasticity; and collinearity of less than 0.80 (Pearson's *r*) between independent variables. Minimum sample size is an assumption that can range from 10 to 50 cases, where the ideal minimum is $50 + 8m$, where m = the number of independent variables (Abu-Bader, 2011). The anchoring bias intervention group had 61 cases, slightly below the ideal number (n = 66) according to the $50 + 8m$ formula.

Research Question 1 and Hypotheses 1

RQ1: Does anchoring bias influence the decision-making of K-12 public education administrators in personnel management and organizational policymaking?

H1: The high anchoring bias control group will indicate a significantly higher mean response to each anchoring bias decision scenario than will the low anchoring bias control group.

H1o: There is no significant difference between the mean responses of the high anchoring bias control group and low anchoring bias control group.

Table 14. Anchoring Bias Intervention Group Responses on Consider-the-Opposite (COS) Feedback Quality - Unstandardized Regression Coefficients.

	r	***B***	***t***	***p***	**R^2**	**C.I. Lower *(B)***	**C.I. Upper (*B*)**
Scenario 1: High Anchoring Bias (0-100, Personnel Eval Scale)							
Constant		121.13	15.33	<.001	53.70%		
COS Feedback Quality	-0.61*	-4.81	-5.37	**<.001**		-6.64	-2.98
Age (years)	-0.28	-0.34	-3.21	**.003**		-0.56	-0.13
Scenario 1: Low Anchoring Bias (0-100, Personnel Eval Scale)							
Constant		66.65	7.88	<.001	20.6%		
COS Feedback Quality	.429*	3.21	2.48	**.021**		0.54	5.88
Age (years)	-0.06	-0.12	-0.82	.422		-0.41	0.18
Scenario 2: High Anchoring Bias (# Hours, Personnel Communication Policy)							
Constant		36.10	1.79	.084	15.20%		
COS Feedback Quality	-0.09	-6.10	-1.53	.137		-14.26	2.06
Age (years)	0.28	0.80	2.14	**.042**		0.03	1.56
Scenario 2: Low Anchoring Bias (# Hours, Personnel Communication Policy)							
Constant		-24.96	-1.21	.237	29.70%		
COS Feedback Quality	0.42*	4.48	2.15	**.041**		0.19	8.77
Age (years)	0.41*	0.81	2.08	**.048**		0.01	1.61
Scenario 3: High Anchoring Bias (# Days, Personnel Discipline Policy)							
Constant		33.97	3.55	.002	13.90%	13.85	54.09
COS Feedback Quality	-0.22	-1.03	-0.86	.397		-3.47	1.42
Age (years)	-0.34*	-0.29	-1.71	.098		-0.64	0.06
Scenario 3: Low Anchoring Bias (# Days, Personnel Discipline Policy)							
Constant		0.15	0.04	.971	16.70%	-8.38	8.69
COS Feedback Quality	.397*	1.00	1.92	.066		-0.07	2.07
Age (years)	.231	0.50	0.55	.589		-0.13	0.22

Note: COS Feedback Quality has been recoded into a binary variable

Research Question 2 and Hypotheses 2a and 2b

RQ2: Does a consider-the-opposite debiasing intervention mitigate the influence of anchoring bias in decision-making of K-12 public education administrators in personnel management and organizational policymaking?

H2a: The high anchoring bias control group will indicate a significantly higher mean response to each anchoring bias decision scenario than will the high anchoring bias intervention group.

H2ao: There is no significant difference between the mean responses of the high anchoring control group and high anchoring intervention group.

H2b: The low anchoring bias control group will indicate a significantly lower mean response to each anchoring bias decision scenario than will the low anchoring bias intervention group.

H2bo: There is no significant difference between the mean responses of the low anchoring control group and low anchoring intervention group.

Research Question 3 and Hypotheses 3a and 3b

RQ3: Does the quality of consider-the-opposite feedback influence the effectiveness of the consider-the-opposite debiasing intervention in mitigating the influence of anchoring bias?

H3a: Consider-the-opposite feedback quality will significantly influence the debiasing mitigation of high anchoring bias influence. There will be an inverse linear relationship between the intervention group's total feedback quality rating and responses to high anchoring bias decision scenarios. (i.e., the higher the feedback quality, the lower the responses.)

H3ao: There is no significant inverse linear relationship between consider-the-opposite feedback quality and the intervention group responses.

H3b: Consider-the-opposite feedback quality will significantly influence the debiasing mitigation of low anchoring bias influence. There will be a direct linear relationship between the intervention group's total feedback quality rating and responses to low anchoring bias decision scenarios. (i.e., the higher the feedback quality, the higher the responses.)

H3bo: There is no significant direct linear relationship between consider-the-opposite feedback quality and the intervention group responses.

Anchoring Bias Decision Scenario #1: Personnel Evaluation (1-100 scale)

Research Question 1 and Hypotheses 1

RQ1: Does anchoring bias influence the decision-making of K-12 public education administrators in personnel management?

Hypothesis 1 Resolution

An independent samples t-test was conducted to assess the difference in mean personnel evaluation scores between the high anchoring bias control group (M = 86.90, SD = 5.40; N = 86) and the low anchoring bias control group (M = 75.98; SD = 10.70; N = 92). A significant difference was found between the two groups (t (139.67) = 8.85; $p < .001$), indicating that the high anchoring bias control group mean was 10.92 points higher than the low anchoring bias control group mean, as hypothesized. The effect size is very large (Cohen's $d = 1.30$).

The anchoring bias statements contained a low anchor prompt (evaluation score = 57) and high anchor prompt (evaluation score = 83) which were less extreme than in two prior studies, which both utilized 51 as the low anchor prompt and 91 as the high anchor prompt (Bellé

et al., 2017; Nagtegaal et al., 2020). Nevertheless, the effect size in this study is comparable to the respective effect sizes of the prior studies: 1.21 (Bellé et al., 2017) and 1.98 (Nagtegaal et al., 2020).

Research Question 2 and Hypotheses 2a and 2b

RQ2: Does a consider-the-opposite debiasing intervention mitigate the influence of anchoring bias in decision-making of K-12 public education administrators in personnel management?

Hypothesis 2a Resolution

An independent samples t-test was conducted to assess the difference in mean personnel evaluation scores between the high anchoring bias control group (M = 86.90, SD = 5.40; N = 86) and the high anchoring bias intervention group (M = 78.67; SD = 6.40; N = 32). A significant difference was found between the two groups (t (114.00) = 6.94; $p < .001$), indicating that the high anchoring intervention group mean was 8.23 points lower than the high anchoring control group mean, as hypothesized. The effect size is very large (Cohen's $d = 1.47$). The effect size is comparable to Nagtegaal and colleagues' (2020) study, which elicited two consider-the-opposite reasons related to the high anchor prompt (e.g., why the anchor value was inappropriate) and resulted in an effect size of 1.98.

Hypothesis 2b Resolution

An independent samples t-test was conducted to assess the difference in mean personnel evaluation scores between the low anchoring bias control group (M = 76.0, SD = 10.7; N = 92). and the low anchoring bias intervention group (M = 74.16; SD = 6.40; N = 29). No significant difference was found between the two groups (t (82.93) = 1.14; $p = .259$), while the low

anchoring intervention group mean was in fact 1.82 lower than the low anchoring control group mean, not as hypothesized.

Research Question 3 and Hypotheses 3a and 3b

RQ3: Does the quality of consider-the-opposite feedback influence the effectiveness of the consider-the-opposite debiasing intervention in mitigating the influence of anchoring bias?

Hypothesis H3a Resolution

A multiple linear regression model that included age as a covariate was utilized to assess whether consider-the-opposite (COS) feedback quality predicted high anchoring bias intervention group responses for the personnel evaluation score. The binary COS feedback variable (p = <.001) and the continuous covariate of age (p = .003) were both found significant as inversely linear predictors of intervention group responses. The model indicates that these variables accounted for 53.70% of the intervention group responses. To employ a linear regression model, the COS feedback variable was evaluated with an ANOVA model to determine where to split the variable into binary groups. For high anchoring bias scenario #1, this cut point was between medium-high and high COS feedback quality.

In conclusion, all else held constant, on average, when study participants provided COS feedback with a quality rated high or very high, the high anchoring bias intervention group response for the personnel evaluation score decreased by 4.81 points, as contrasted with study participants whose COS feedback quality was rated medium-high or lower. Similarly, with every one-year increase in a study participant's age, the personnel evaluation score decreased by 0.34 points.

Hypothesis 3b Resolution

A multiple linear regression model that included age as a covariate was utilized to assess whether consider-the-opposite (COS) feedback quality predicted low anchoring bias intervention group responses for the personnel evaluation score. Results support the hypothesis, as the binary consider-the-opposite (COS) feedback variable (p = .021) was found significant as a directly linear predictor of low anchoring bias intervention group responses. However, the continuous covariate of age (p = .443) was not only found not significant; but it also has an inverse, not direct, linear relationship to low anchoring bias intervention group responses. The model indicates that these variables accounted for 20.60% of the intervention group responses.

To employ a linear regression model, the COS feedback variable was evaluated with an ANOVA model to determine where to split the variable into binary groups. For low anchoring bias scenario #1, this cut point was between medium-high and high COS feedback quality.

In conclusion, all else held constant, on average, when study participants provided COS feedback with a quality rated high or very high, the low anchoring bias intervention group response for the personnel evaluation score increased by 3.21 points, as contrasted with study participants whose COS feedback quality was rated medium-high or lower.

Anchoring Bias Decision Scenario #2: Personnel Communication Policy (# Hours Required for Phone/Email Response)

Research Question and Hypothesis 1

RQ1: Does anchoring bias influence the decision-making of K-12 public education administrators in personnel management and organizational policymaking?

Hypothesis 1 Resolution

An independent samples t-test was conducted to assess the difference in mean number of hours for the communications policy between the high anchoring bias control group (M = 41.05,

SD = 19.4; N = 95) and the low anchoring bias control group (M = 23.54; SD = 8.10; N = 83). A significant difference was found between the two groups (t (129.09) = 8.02; $p < .001$) indicating that the high anchoring bias control group mean was 17.51 points higher than the low anchoring bias control group mean, as hypothesized. The effect size is very large (Cohen's $d = 1.15$).

The anchoring bias statements contained a low anchor prompt (12 hours) and high anchor prompt (72 hours). This measurement and extremeness differed from the prior study, which measured time in days and utilized two days as the low anchor prompt and 90 days at the high anchor prompt (Nagtegaal et al., 2020). Nevertheless, the effect size in this study is comparable to or larger than the respective effect sizes of the prior studies: 0.41 (Bellé et al., 2017) and 1.37 (Nagtegaal et al., 2020).

Research Question 2 and Hypotheses 2a and 2b

RQ2: Does a consider-the-opposite debiasing intervention mitigate the influence of anchoring bias in decision-making of K-12 public education administrators in personnel management and organizational policymaking?

Hypothesis 2a Resolution

An independent samples t-test was conducted to assess the difference in mean number of hours for the communications policy between the high anchoring bias control group (M = 41.05, SD = 19.4; N = 95) and the high anchoring bias intervention group (M = 47.57; SD = 16.0; N = 30). No significant difference was found between the two groups (t (58.30) = -1.84; $p = .071$), as the high anchoring intervention group mean was in fact 6.51 points higher, not lower, than the high anchoring control group mean, not as hypothesized.

The anchoring bias statements contained a high anchor prompt of 72 hours. This measurement and extremeness differed from the prior study, which measured time in days and utilized 90 days at the high anchor prompt (Nagtegaal et al., 2020).

Hypothesis 2b Resolution

An independent samples t-test was conducted to assess the difference in mean number of hours for the communications policy between the low anchoring bias control group (M = 37.81; SD = 8.10; N = 83) and the low anchoring bias intervention group (M = 23.54, SD = 8.10; N = 31). A significant difference was found between the two groups (t (35.23) = -4.50; $p < .001$), indicating that the low anchoring intervention group mean was 14.26 points higher than the low anchoring control group mean, as hypothesized. The effect size is very large (Cohen's $d = 1.28$).

The anchoring bias statement contained a low anchor prompt of 12 hours. This measurement and extremeness differed from the prior study, which measured time in days and utilized two days at the low anchor prompt (Nagtegaal et al., 2020). Even so, this study's effect size is much larger than Nagtegaal and colleagues' (2020) study, which elicited two consider-the-opposite reasons related to the low anchor prompt (e.g., why the anchor value was inappropriate) and resulted in an effect size of 0.43.

Research Question 3 and Hypotheses 3a and 3b

RQ3: Does the quality of consider-the-opposite feedback influence the effectiveness of the consider-the-opposite debiasing intervention in mitigating the influence of anchoring bias?

Hypothesis H3a Resolution

A multiple linear regression model that included age as a covariate was utilized to assess whether consider-the-opposite (COS) feedback quality predicted high anchoring bias

intervention group responses for the number of hours for the communications policy. The binary consider-the-opposite (COS) feedback variable (p = .137) was found not significant as an inversely linear predictor of high anchoring bias intervention group responses. However, the continuous covariate of age (p = .042) was found significant as an inversely linear predictor of high anchoring bias intervention group responses. The model indicates that these variables accounted for 15.20% of the variance in intervention group responses.

To employ a linear regression model, the COS feedback variable was evaluated with an ANOVA model to determine where to split the variable into binary groups. For high anchoring bias scenario #2, this cut point was between medium-high and high COS feedback quality.

In conclusion, all else held constant, on average, with every one-year increase in a study participant's age, the number of hours set for the communications policy decreased by 0.28.

Hypothesis 3b Resolution

A multiple linear regression model that included age as a covariate was utilized to assess whether consider-the-opposite (COS) feedback quality predicted low anchoring bias intervention group responses for the number of hours for the communications policy. Both the binary consider-the-opposite (COS) feedback variable (p =.041) and the continuous covariate of age (p = .048) were found significant as directly linear predictors of low anchoring bias intervention group responses. The model indicates that these variables accounted for 29.70% of the variance in intervention group responses.

To employ a linear regression model, the COS feedback variable was evaluated with an ANOVA model to determine where to split the variable into binary groups. For low anchoring bias scenario #2, this cut point was between medium-high and high COS feedback quality.

In conclusion, all else held constant, on average, when study participants provided COS feedback with a quality rated high or very high, the low anchoring bias intervention group response for the number of hours increased by 4.48, as contrasted with study participants whose COS feedback quality was rated medium-high or lower. Similarly, with every one-year increase in a study participant's age, the number of hours set for the communications policy increased by 0.81.

Anchoring Bias Decision Scenario #3: Personnel Discipline Policy (# Days Required for Teacher Suspension)

Research Question and Hypothesis 1

RQ1: Does anchoring bias influence the decision-making of K-12 public education administrators in personnel management and organizational policymaking?

Hypothesis 1 Resolution

An independent samples t-test was conducted to assess the difference in mean number of days set for the personnel discipline policy between the high anchoring bias control group (M = 21.51, SD = 14.40; N = 86) and the low anchoring bias control group (M = 4.34; SD = 2.70; N = 92). A significant difference was found between the two groups (t (90.67) = 10.88 ; $p < .001$), indicating that the high anchoring bias control group mean was 17.18 higher than the low anchoring bias control group mean, as hypothesized. The effect size is very large (Cohen's d = 1.69). This decision scenario was novel and devised specifically for the study sample. Thus, no comparison between studies can yet be made regarding the effect size.

Research Question 2 and Hypotheses 2a and 2b

RQ2: Does a consider-the-opposite debiasing intervention mitigate the influence of anchoring bias in decision-making of K-12 public education administrators in personnel management and organizational policymaking?

Hypothesis 2a Resolution

An independent samples t-test was conducted to assess the difference in mean number of days for the personnel discipline policy between the high anchoring bias control group (M = 21.51, SD = 19.40; N = 86) and the high anchoring bias intervention group (M = 13.06; SD = 16.0; N = 31). A significant difference was found between the two groups (t (88.15) = 3.84; $p < .001$), indicating that the high anchoring intervention group mean was 8.45 lower than the high anchoring control group mean, as hypothesized. The effect size is medium (Cohen's $d = 0.64$). This decision scenario was novel and devised specifically for the study sample. Thus, no comparison between studies can yet be made regarding the effect size.

Hypothesis 2b Resolution

An independent samples t-test was conducted to assess the difference in mean number of days for the personnel discipline policy between the low anchoring bias control group (M = 4.34; SD = 2.70; N = 92) and the low anchoring bias intervention group (M = 6.60, SD = 4.40; N = 30). A significant difference was found between the two groups (t (36.36) = 2.62; $p = .012$), indicating that the low anchoring intervention group mean was 2.26 higher than the low anchoring control group mean, as hypothesized.

The effect size is medium (Cohen's $d = 0.70$). This decision scenario was novel and devised specifically for the study sample. Thus, no comparison between studies can yet be made regarding the effect size.

Research Question 3 and Hypotheses 3a and 3b

RQ3: Does the quality of consider-the-opposite feedback influence the effectiveness of the consider-the-opposite debiasing intervention in mitigating the influence of anchoring bias?

Hypothesis H3a Resolution

A multiple linear regression model that included age as a covariate was utilized to assess whether consider-the-opposite (COS) feedback quality predicted high anchoring bias intervention group responses for the number of days for the personnel discipline policy. The binary consider-the-opposite (COS) feedback variable (p = .397) and the continuous covariate of age (p = .098) were found not significant as inversely linear predictors of high anchoring bias intervention group responses. The model indicates that these variables accounted for 13.90% of the variance in intervention group responses.

To employ a linear regression model, the COS feedback variable was evaluated with an ANOVA model to determine where to split the variable into binary groups. For high anchoring bias scenario #3, this cut point was between medium-high and high COS feedback quality.

Hypothesis 3b Resolution

A multiple linear regression model that included age as a covariate was utilized to assess whether consider-the-opposite (COS) feedback quality predicted low anchoring bias intervention group responses for the number of days for the personnel discipline policy. Both the binary consider-the-opposite (COS) feedback variable (p =.066) and the continuous covariate of age (p = .589) were found not significant as directly linear predictors of low anchoring bias intervention group responses. The model indicates that these variables accounted for 16.70% of the variance in intervention group responses.

To employ a linear regression model, the COS feedback variable was evaluated with an ANOVA model to determine where to split the variable into binary groups. For low anchoring bias scenario #3, this cut point was between medium-high and high COS feedback quality.

Results of Statistical Analyses for Attribute Framing Bias Groups

Preliminary Bivariate Analysis

For the attribute framing bias groups (Table 15), a preliminary bivariate analysis was conducted to determine whether any covariates were significantly different among the four groups: positive framing control, positive framing intervention, negative framing control, and negative framing intervention. Three covariates were found statistically significant either from a one-way ANOVA or Chi-Square analysis. Results of a one-way ANOVA indicated that, at the .05 level, age (p <.001) and *total years* in any K-12 public education administration position (p = .045) were statistically significant, whereas years in current position (p = .253) was not. Results of a Chi-Square test indicated that, at the .05 level, education level (p = .001) was statistically significant, whereas school district size (p = .083) was not.

Table 15. Characteristics of Attribute Framing Bias Groups.

Variable	**Overall**	**PFC**	**PFI**	**NFC**	**NFI**	**χ^2 / F**	***p***
Years in Current Position	5.8	6.5	5.6	5.2	5.5	1.4	.253
Years in K-12 Public Ed. Admin. Position(s)	15.0	14.3	18.7	13.1	18.6	7.1	**<.001**
Education Level (%)						26.7	**<.001**
Master's Degree	31.0	34.4	12.9	43.2	3.3		
Some Doctoral Degree	20.9	22.2	22.6	20.5	16.7		
Doctoral Degree	48.1	43.3	64.5	36.4	80.0		
Age (years)	50.1	48.4	57.6	48.6	58.6	23.1	**<.001**
School District Size (%)						11.2	.083
Up to 5,000 students	51.0	44.4	51.6	58.0	50.0		
5,001-30,000 students	32.2	37.8	25.8	33.0	20.0		
30,001 or more students	16.7	17.8	22.6	9.0	30.0		

Note: PFC = Positive Framing Control Group; PFI = Positive Framing Intervention Group; NFC = Negative Framing Control Group; NFI = Negative Framing Intervention Group

As described for the bivariate analysis of anchoring bias groups, the variable of age was the only covariate selected for inclusion in the multiple regression analysis for several reasons. First, due to its significant correlation to *total years* in K-12 public education administration positions ($r = .724$, $p < .001$). Second, both age ($p < .001$) and *total years* ($p < .001$) were found to be significant in the bivariate analysis of the attribute framing bias groups. Finally, age was also found to be statistically significant in the bivariate analysis of covariates for the anchoring bias groups. Hence, only age was included as a covariate in the multiple regression analysis to maintain continuity of the multivariate analyses for anchoring bias groups and attribute framing bias groups.

Statistical Approaches to Resolve Hypotheses for Attribute Framing Bias Groups

Restated below are the research questions, research hypotheses, and null hypotheses that were addressed quantitatively for each of the three-attribute framing bias decision scenarios. Subsequently, there is a separate section for each attribute framing bias decision scenario which reports on the resolution of all hypotheses.

Independent Samples T-Tests

Table 16 displays results of independent samples t-tests employed to resolve Hypotheses 4, 5a, and 5b. Prior to conducting the independent samples t-tests for each anchoring bias decision scenario, an evaluation of assumptions was performed to ensure that this parametric test was appropriate to resolve H4, H5a, and H5b. These assumptions are: two categorical independent variables, paired observations, a dependent variable at interval level or higher, normal distribution of the dependent variable, and a minimum of 30 cases. Another independent samples t-test assumption is the homogeneity of variance between the two groups under comparison. This assumption is evaluated directly within the t-test analysis in SPSS, which

builds in a Levene's *F* Test for Equality of Variances. When the homogeneity of variance assumption was violated (i.e., $p < 0.05$), the resultant t-test *p* value for the between-groups means comparison was interpreted accordingly. This violation occurred for most attribute framing bias group comparisons, which is indicated where the degrees of freedom (*df*) statistic is not a whole number.

Table 16. Attribute Framing Bias Group Comparisons Results.

Between-Group Comparisons	**Mean Diff.**	***t***	***df***	***p***	***Cohen's d****	***C.I. Upper***	***C.I. Lower***
Scenario 1: Attribute Framing Bias (Curricular Policy, 0-100 Likelihood)							
PFC (85.70) — NFC (76.70)	9.00	6.70	169.01	**<.001**	1.01	0.69	1.32
PFC (85.70) — PFI (57.23)	28.47	7.07	32.87	**<.001**	2.18	1.69	2.67
NFC (76.70) — NFI (51.17)	(25.54)	5.97	32.69	(<.001)	N/A	N/A	N/A
Scenario 2: Attribute Framing Bias (Student Policy, 0-100 Likelihood)							
PFC (62.94) — NFC (21.16)	41.78	12.79	176.00	**<.001**	1.92	1.56	2.27
PFC (62.94) — PFI (34.70)	28.24	6.09	115.00	**<.001**	1.29	0.84	1.73
NFC (21.16) — NFI (33.10)	-11.93	2.02	42.31	**.033**	-0.53	-0.94	0.11
Scenario 3: Attribute Framing Bias (Budget Policy, 0-100 Likelihood)							
PFC (57.63) — NFC (17.63)	40.00	11.52	149.80	**<.001**	1.73	1.38	2.07
PFC (57.63) — PFI (56.60)	-1.03	0.21	64.25	.833	0.04	-0.38	0.45
NFC (17.63) — NFI (40.35)	22.73	5.10	43.60	**<.001**	-1.20	-1.63	0.76

Notes: PFC = Positive Framing Control Group; PFI = Positive Framing Intervention Group
NFC = Negative Framing Control Group; NFI = Negative Framing Intervention Group

Multiple Regression Modeling

The results of multiple regression modeling for the Hypotheses 6a and 6b are reported in Table 17. Prior to conducting the multiple regression analysis for each anchoring bias decision scenario, an evaluation of assumptions was performed to ensure that this parametric test was appropriate to resolve H6a and H6b. These assumptions are: a dependent variable at interval level or higher, *or* a dependent variable at categorical or ordinal level coded into a binary dummy variable; normal distribution of the dependent variable; linearity between the independent and

dependent variables; homoscedasticity; and collinearity of less than 0.80 (Pearson's *r*) between independent variables. Minimum sample size is an assumption that can range from 10 to 50 cases, where the ideal minimum sample is 50 + 8*m*, where *m* = the number of independent variables (Abu-Bader, 2011). The attribute framing bias intervention group had 61 cases, slightly below the ideal number (n = 66) according to the 50 + 8*m* formula.

Table 17. Attribute Framing Bias Intervention Group Responses on Consider-the-Opposite (COS) Feedback Quality - Unstandardized Regression Coefficients

	r	***B***	***t***	***p***	**R^2**	**CI Lower**	**CI Upper**
Scenario 1: Positive Framing Bias (Curricular Policy, 0-100 Likelihood)							
Constant		26.60	0.88	.389	31.30%	-35.69	88.90
COS Feedback Quality	-0.51*	-21.63	-3.27	**.003**		-35.20	-8.06
Age (years)	0.23	0.76	1.51	.141		-0.27	1.80
Scenario 2: Positive Framing Bias (Student Policy, 0-100 Likelihood)							
Constant		101.41	3.27	.003	39.60%		
COS Feedback Quality	-.062*	-41.67	-4.07	**<.001**		-62.58	-20.75
Age (years)	-0.22	-0.43	-0.78	.440		-1.54	0.69
Scenario 2: Negative Framing Bias (Student Policy, 0-100 Likelihood)							
Constant		52.79	1.22	.236	19.30%	-36.73	142.31
COS Feedback Quality	0.41*	24.81	2.28	**.031**		2.43	47.20
Age (years)	-0.16	-0.62	-0.86	.400		-2.10	0.87
Scenario 3: Positive Framing Bias (Budget Policy, 0-100 Likelihood)							
Constant		75.38	2.04	.051	21.30%	-0.41	151.17
COS Feedback Quality	-0.46*	-24.79	-2.67	**.013**		-43.83	-5.76
Age (years)	-0.07	-0.29	-0.47	.644		-1.56	0.98

Note: COS Feedback Quality was recoded into a binary variable

Research Question 4 and Hypotheses 4

RQ4: Does attribute framing bias influence the decision-making of K-12 public education administrators in organizational policymaking?

H1: The positive framing bias control group will indicate a significantly higher mean response to each attribute framing bias decision scenario than will the negative framing bias control group.

H4o: There is no significant difference between the mean responses of the positive framing control group and negative framing bias control group.

Research Question 5 and Hypotheses 5a and 5b

RQ5: Does a consider-the-opposite debiasing intervention mitigate the influence of attribute framing bias in decision-making of K-12 public education administrators in organizational policymaking?

H5a: The positive framing bias control group will indicate a significantly higher mean response to each anchoring bias decision scenario than will the positive framing bias intervention group.

H5ao: There is no significant difference between the mean responses of the positive framing control group and negative framing intervention group.

H5b: The negative framing bias control group will indicate a significantly lower mean response to each attribute framing bias decision scenario than will the negative framing bias intervention group.

H5bo: There is no significant difference between the mean responses of the negative framing control group and negative framing intervention group.

Research Question 6 and Hypotheses 6a and 6b

RQ6: Does the quality of consider-the-opposite feedback influence the effectiveness of the consider-the-opposite debiasing intervention in mitigating the influence of attribute framing bias?

H6a: Consider-the-opposite feedback quality will significantly influence the debiasing mitigation of positive framing bias influence. There will be an inverse linear relationship between the intervention group's total feedback quality rating and responses to positive framing bias decision scenarios. (i.e., the higher the feedback quality, the lower the responses.)

H6ao: There is no significant inverse linear relationship between consider-the-opposite feedback quality and the positive framing intervention group responses.

H6b: Consider-the-opposite feedback quality will significantly influence the debiasing mitigation of negative framing bias influence. There will be a direct linear relationship between the intervention group's total feedback quality rating and responses to negative framing bias decision scenarios. (i.e., the higher the feedback quality, the higher the responses.)

H6bo: There is no significant direct linear relationship between consider-the-opposite feedback quality and the negative framing intervention group responses.

Attribute Framing Bias Decision Scenario #1: Curricular Policy (0-100 Likelihood Scale).

Research Question 4 and Hypotheses 4

RQ4: Does attribute framing bias influence the decision-making of K-12 public education administrators in organizational policymaking?

Hypothesis 4 Resolution

An independent samples t-test was conducted to assess the difference in mean likelihood to support the curricular policy between the positive framing bias control group (M = 85.70, SD = 8.10; N = 90) and the negative framing bias control group (M = 76.70; SD = 9.70; N = 88). A significant difference between the two groups was found (t (169.01) = 6.70; $p < .001$), indicating

that the positive framing bias control group mean was 9.00 higher than the negative framing bias control group mean.

The effect size is large (Cohen's $d = 1.01$). This decision scenario was novel and devised specifically for the study sample. Thus, no comparison between studies can yet be made regarding the effect size.

Research Question 5 and Hypotheses 5a and 5b

RQ5: Does a consider-the-opposite debiasing intervention mitigate the influence of attribute framing bias in decision-making of K-12 public education administrators in organizational policymaking?

Hypothesis 5a Resolution

An independent samples t-test was conducted to assess the difference in mean likelihood to support the curricular policy between the positive framing bias intervention group (M = 57.23; SD = 21.91; N = 31) and the positive framing bias control group (M = 85.70, SD = 8.10; N = 90). A significant difference between the two groups was found (t (32.87) = 7.07; $p < .001$), indicating that the positive framing bias intervention group mean was 28.47 lower than the positive framing bias control group mean, as hypothesized.

The effect size is extremely large (Cohen's $d = 2.18$). This decision scenario was novel and devised specifically for the study sample. Thus, no comparison between studies can yet be made regarding the effect size.

Hypothesis 5b Resolution

An independent samples t-test was conducted to assess the difference in mean likelihood to support the curricular policy between the negative framing bias intervention group (M = 51.17; SD = 22.74; N = 30) and the negative framing bias control group (M = 76.70, SD = 9.73;

N = 88). The difference between the two groups was significant (t (32.69) = 5.97; $p < .001$), but in the opposite direction than was hypothesized, as results indicated that the negative framing bias intervention group mean was 25.54 lower, not higher, than the negative framing bias control group mean.

Research Question 6 and Hypotheses 6a and 6b

RQ6: Does the quality of consider-the-opposite feedback influence the effectiveness of the consider-the-opposite debiasing intervention in mitigating the influence of attribute framing bias?

Hypothesis H6a Resolution

A multiple linear regression model that included age as a covariate was utilized to assess whether the quality of consider-the-opposite (COS) feedback predicted positive framing bias intervention group responses for the likelihood to support the curricular policy. The binary COS feedback variable ($p = .003$) was found significant as an inversely linear predictor of positive framing bias intervention group responses. By contrast, the covariate of age was found not significant ($p = .141$). The model indicates that these variables accounted for 31.30% of the variance in intervention group responses.

To employ a linear regression model, the COS feedback variable was evaluated with an ANOVA model to determine where to split the variable into binary groups. For positive framing bias scenario #1, this cut point was between medium-high and high COS feedback quality.

In conclusion, all else held constant, on average, when study participants provided COS feedback with a quality rated high or very high, the positive framing bias intervention group response for the likelihood to support the curricular policy decreased by 21.63 points, as contrasted with study participants whose COS feedback quality was rated medium-high or lower.

Hypothesis 6b Resolution

A multiple linear regression model that included age as a covariate was intended to be utilized to assess whether the quality of consider-the-opposite (COS) feedback predicted negative framing bias intervention group responses for the likelihood to support the curricular policy. To employ a linear regression model, the COS feedback variable was evaluated with an ANOVA model to determine where to split the variable into binary groups. However, in this case, the six groups of the COS feedback variable were found not significantly different from each other in a linear fashion.

Attribute Framing Bias Decision Scenario #2: Student Policy (1-100 Likelihood Scale)

Research Question and Hypothesis 4

RQ4: Does attribute framing influence the decision-making of K-12 public education administrators in organizational policymaking?

Hypothesis 4 Resolution

An independent samples t-test was conducted to assess the difference in mean likelihood to support the student policy between the positive framing bias control group (M = 62.94, SD = 22.7; N = 91) and the negative framing bias control group (M = 21.16; SD = 20.90; N = 91). A significant difference between the two groups was found (t (176) = 12.79; $p < .001$), indicating that the positive framing bias control group mean was 41.78 higher than the negative framing bias control group mean, as hypothesized.

The effect size is extremely large (Cohen's $d = 1.92$). This decision scenario was novel and devised specifically for the study sample. Thus, no comparison between studies can yet be made regarding the effect size.

Research Question 5 and Hypotheses 5a and 5b

RQ5: Does a consider-the-opposite debiasing intervention mitigate the influence of anchoring bias in decision-making of K-12 public education administrators in organizational policymaking?

Hypothesis 5a Resolution

An independent samples t-test was conducted to assess the difference in mean likelihood to support the student policy between the positive framing bias intervention group (M = 34.70; SD = 23.70; N = 33) and the positive framing bias control group (M = 62.94, SD = 22.70; N = 87). A significant difference between the two groups was found (t (115) = 6.09; $p < .001$) than indicating that the positive framing bias intervention group mean was 28.24 lower than the positive framing bias control group mean, as hypothesized.

The effect size is very large (Cohen's $d = 1.29$). This decision scenario was novel and devised specifically for the study sample. Thus, no comparison between studies can yet be made regarding the effect size.

Hypothesis 5b Resolution

An independent samples t-test was conducted to assess the difference in mean likelihood to support the student policy between the negative framing bias intervention group (M = 33.10, SD = 22.70; N = 30) and the negative framing bias control group (M = 21.16; SD = 9.70; N = 88). A significant difference between the two groups was found (t (42.31) = 2.02; $p = .033$), indicating that the negative framing bias intervention group mean was 11.93 higher than the negative framing bias control group mean, as hypothesized.

The effect size is medium (Cohen's $d = 0.53$). This decision scenario was novel and devised specifically for the study sample. Thus, no comparison between studies can yet be made regarding the effect size.

Research Question 6 and Hypotheses 6a and 6b

RQ6: Does the quality of consider-the-opposite feedback influence the effectiveness of the consider-the-opposite debiasing intervention in mitigating the influence of anchoring bias?

Hypothesis H6a Resolution

A multiple linear regression model that included age as a covariate was utilized to assess whether the quality of consider-the-opposite (COS) feedback predicted positive framing bias intervention group responses for the likelihood to support the student policy. The binary COS feedback variable ($p < .001$) was found significant as an inversely linear predictor of positive framing bias intervention group responses. By contrast, the covariate of age was found not significant ($p = .440$). The model indicates that these variables accounted for 39.60% of the variance in intervention group responses.

To employ a linear regression model, the COS feedback variable was evaluated with an ANOVA model to determine where to split the variable into binary groups. For positive framing bias scenario #2, this cut point was between medium-low and medium COS feedback quality.

In conclusion, when study participants provided COS feedback with a quality rated high or very high, the positive framing bias intervention group response for the likelihood to support the student policy decreased by 41.67 points, as contrasted with study participants whose COS feedback quality was rated medium-low or lower.

Hypothesis 6b Resolution

A multiple linear regression model that included age as a covariate was utilized to assess whether the quality of consider-the-opposite (COS) feedback predicted negative framing bias intervention group responses for the likelihood to support the student policy. The binary COS feedback variable (p = .031) was found significant as a directly linear predictor of negative framing bias intervention group responses. By contrast, the covariate of age (p = .400) was found not significant. The model indicates that these variables accounted for 19.30% of the variance in intervention group responses.

To employ a linear regression model, the COS feedback variable was evaluated with an ANOVA model to determine where to split the variable into binary groups. For negative framing bias scenario #2, this cut point was between medium-high and high COS feedback quality.

In conclusion, when study participants provided COS feedback with a quality rated high or very high, the negative framing bias intervention group response for the likelihood to support the student policy increased by 24.81 points, as contrasted with study participants whose COS feedback quality was rated medium-high or lower.

Attribute Framing Bias Scenario #3: Budget Policy (0-100 Likelihood Scale)

Research Question and Hypothesis 4

RQ4: Does attribute framing bias influence the decision-making of K-12 public education administrators in organizational policymaking?

Hypothesis 4 Resolution

An independent samples t-test was conducted to assess the difference in mean likelihood to support the budget policy between the positive framing bias control group (M = 57.63, SD = 27.60; N = 89) and the negative framing bias control group (M = 17.63; SD = 17.70; N = 89). A significant difference between the two groups was found (t (149.80) = 11.52; p < .001),

indicating that the positive framing bias control group mean was 40.00 higher than the negative framing bias control group mean, as hypothesized.

The effect size is extremely large (Cohen's $d = 1.73$). This decision scenario was novel and devised specifically for the study sample. Thus, no comparison between studies can yet be made regarding the effect size.

Research Question 5 and Hypotheses 5a and 5b

RQ5: Does a consider-the-opposite debiasing intervention mitigate the influence of attribute framing bias in decision-making of K-12 public education administrators in organizational policymaking?

Hypothesis 5a Resolution

An independent samples t-test was conducted to assess the difference in mean likelihood to support the budget policy between the positive framing bias intervention group (M = 56.60; SD = 21.30; N = 30) and the positive framing bias control group (M = 57.63, SD = 27.60; N = 89). No significant difference between the two groups was found (t (64.25) = 0.21; $p = .833$), indicating that the positive framing bias intervention group mean was 1.03 lower than the positive framing bias control group mean, not as hypothesized.

Hypothesis 5b Resolution

An independent samples t-test was conducted to assess the difference in mean likelihood to support the student policy between the negative framing bias intervention group (M = 40.35, SD = 22.50; N = 31) and the negative framing bias control group (M = 17.63; SD = 17.63; N = 89). A significant difference between the two groups was found (t (43.60) = 5.10; $p < .001$), indicating that the negative framing bias intervention group mean was 22.73 higher than the negative framing bias control group mean, as hypothesized.

The effect size is large (Cohen's $d = 1.20$). This decision scenario was novel and devised specifically for the study sample. Thus, no comparison between studies can yet be made regarding the effect size.

Research Question 6 and Hypotheses 6a and 6b

RQ6: Does the quality of consider-the-opposite feedback influence the effectiveness of the consider-the-opposite debiasing intervention in mitigating the influence of attribute framing bias?

Hypothesis H6a Resolution

A multiple linear regression model that included age as a covariate was utilized to assess whether the quality of consider-the-opposite (COS) feedback predicted positive framing bias intervention group responses for the likelihood to support the budget policy. The binary COS feedback variable ($p = .013$) was found significant as an inversely linear predictor of positive framing bias intervention group responses. By contrast, the covariate of age was found not significant ($p = .644$). The model indicates that these variables accounted for 21.30% of the variance in intervention group responses.

To employ a linear regression model, the COS feedback variable was evaluated with an ANOVA model to determine where to split the variable into binary groups. For positive framing bias scenario #3, this cut point was between medium-high and high COS feedback quality. In conclusion, all else held constant, on average, when study participants provided COS feedback with a quality rated high or very high, the positive framing bias intervention group response for the likelihood to support the budget policy decreased by 24.79 points, as contrasted with study participants whose COS feedback was rated medium-high or lower.

Hypothesis 6b Resolution

A multiple linear regression model that included age as a covariate was intended to be utilized to assess whether the quality of consider-the-opposite (COS) feedback predicted negative framing bias intervention group responses for the likelihood to support the budget policy.

To employ a linear regression model, the COS feedback variable was evaluated with an ANOVA model to determine where to split the variable into binary groups. However, in this case, the six groups of the COS feedback variable were found not significantly different from each other in a linear fashion.

Chapter V: Discussion

Introduction

This chapter first relates an overview of the dissertation study's significance. This is followed by an interpretation of the qualitative and quantitative findings, situating the mixed-methods study in the literature and methodological contexts by which the study was framed. Next, theoretical and practical implications for the research findings are elaborated. Lastly, study limitations are addressed and then related to recommendations for future research and practice.

Study Significance

This study consisted of a two-stage, mixed-methods (qual-QUAN) research design. The study responded to public administration scholar Herbert Simon's (1946, 1947) call from about 75 years ago to conduct empirical research on decision-making in the political and organizational contexts in which public administrators *actually* make decisions. The title *Unbounding Rationality* references Simon's (1946) theory of bounded rationality—the genesis of theoretical frameworks employed to observe and mitigate cognitive bias in decision-making. The title also speaks to his argument that researchers should work to improve public administrator decision-making, which, like all humans, deviates from theoretical models that idealize decision-makers as always rational (Simon, 1946, 1947, 1956). An ancestor of bounded rationality theory, behavioral public administration is a now-established theoretical framework, albeit a latecomer to the cognitive bias literature, in which this mixed-methods study was rooted. Behavioral public administration researchers have created momentum for cognitive bias experimental research, which this study also responded to and built upon.

Part-Replicated, Part-Novel Research Design

A mixed-method research design was employed to, first, qualitatively explore the decisions that K-12 public education administrators make in domains of personnel management and organizational policymaking. A structured online interview questionnaire was utilized to elicit this information from 12 retired school district superintendents and school principals, all but one of whom had practiced in Pennsylvania. Results of this first-stage qualitative study were analyzed and utilized to inform the content and context of six decision scenarios presented to participants in the second-stage quantitative study: currently practicing K-12 public school district superintendents and school principals in Pennsylvania. The first-stage qualitative interview questionnaire was novel with no known design of its kind found in the literature on cognitive bias. However, its presence and purpose in this mixed-method study were inspired not only by Simon's call as discussed above, but also by prior quantitative research designs that did not precisely target decision scenarios to the sample studied (Bellé et al., 2017; Bellé, Cantarelli, & Belardinelli, 2018; Belardinelli et al., 2018; Cantarelli et al., 2020). One such study did conduct qualitative focus groups of nurse managers to understand the types of decisions these administrators make in order to increase validity of the quantitative data collection instrument, yet the quantitative study sample included nurse managers, front line nurses, and assistant nurses (Cantarelli et al., 2020).

Furthermore, design of the dissertation quantitative survey-in-the-field instrument responded to calls from prior behavioral public administration researchers to test multiple cognitive bias influences in a single experimental study (Bellé, et al, 2017; Bellé, et al, 2018; Cantarelli et al., 2020; Nagtegaal et al., 2020). To reduce the confounding effects of too many biasing influences on study participants, only two cognitive biases were selected. The inclusion

of anchoring bias and attribute framing bias was intentional, allowing for partial replication of prior experimental studies. Moreover, the influences of these two cognitive biases were captured in Qualtrics survey software utilizing the same 0-100 slider feature, permitting ease of response across the survey-in-the-field.

The survey-in-the-field contained decision scenarios that included biasing statements intended to elicit the influence of anchoring bias and/or attribute framing bias. There were three anchoring bias decision scenarios and three attribute framing bias decision scenarios. The survey-in-the-field comprised mostly novel decision scenario content and context that were tailored for the study sample, as informed by qualitative data analysis. Data measurements were largely replicated as for whole-digit numerical responses to anchoring bias decision scenarios, and the 0-100 likelihood scale responses to attribute framing bias decision scenarios. The differences in data measurement scales between this and the replicated studies are discussed in the *Quantitative Methodology Subchapter,* and below in *Interpretation of Findings*.

Part-Replicated, Part-Novel Debiasing Intervention Strategy

The quantitative quasi-experimental design employed a consider-the-opposite (COS) debiasing intervention strategy based on the experimental designs of two prior research studies. Nagtegaal and colleagues' (2020) experimental design observed and attempted to mitigate the influence of anchoring bias, employing a COS debiasing strategy by asking experiment group participants to provide two reasons why the anchor value (e.g., low anchor or high anchor) was inappropriate. Similarly, Cheng and colleagues' (2014) experimental design evaluated the effectiveness of a COS intervention strategy to mitigate attribute framing bias in consumer choice, by asking experiment group participants to cite four reasons why others might challenge their decision (Cheng et al., 2014). To note, Nagtegaal and colleagues' (2020) study was

conducted via the internet, whereas Cheng and colleagues' (2014) study was conducted in person.

The COS debiasing intervention strategy combined the two strategies discussed above: eliciting reasons why others would challenge their decision, as in Cheng and colleagues (2014); and eliciting only two such reasons, as in Nagtegaal and colleagues (2020). The rationale for eliciting two reasons why others might challenge their decision entailed practical and theoretical reasons. Practically, given that the survey-in-the-field was distributed to study participants' work email addresses, participants were expected to access the survey while at work and thus have time constraints. Theoretically, restricting the COS intervention strategy to two reasons allowed for comparison of independent samples t-test effect sizes found in this study versus the partially replicated behavioral public administration study by Nagtegaal and colleagues (2020).

Furthermore, no known prior researcher had ever asked the question: Does the quality of COS debiasing feedback matter? In other words, is a COS debiasing intervention more effective when COS feedback quality is higher? This line of questioning was partly inspired by Mussweiler and colleagues (2000), whose research on anchoring bias found that the number of COS debiasing responses given by participants significantly correlated with COS interventional influence. The COS debiasing feedback quality significantly predicted COS interventional influence on anchoring bias 50% of the time, and on attribute framing bias 60% of the time. Even when it did not significantly predict the interventional influence, COS feedback quality and participant age accounted for about 15% of the interventional influence.

Interpretation of Findings

Interpretation of Qualitative Study Findings vis-à-vis Quantitative Research Design

The first-stage qualitative study elucidated the phenomenon of decision-making by K-12 public education administrators in domains of personnel management and organizational policymaking. A structured interview questionnaire collected open-ended text data relating to the qualitative research questions, as elaborated in the *Qualitative Study Results* sub-chapter. Qualitative data not only revealed the content of decisions made by school district superintendents and school principals. It also revealed valuable information about the context in which these decisions were made, whether collaboratively, policy oriented, or in isolation. Based on the qualitative data analysis, the context in which school district superintendents and school principals operate and make decisions is highly collaborative. Prior to qualitative data collection, it was expected that decisions by K-12 public education administrators could be prone to anchoring bias and attribute framing bias. However, because collaboration is an integral part of decision-making in K-12 public education, in the second-stage quantitative study, decision scenarios integrated others' input into the decision-making context.

Before discussion of the specific decision scenarios, some speculation is advanced regarding why K-12 public education administrators tend to collaborate in decision-making. First, statutorily, the Pennsylvania government grants each school district's governance authority to the school board of directors, while management authority is granted to the school district superintendent and fellow administrators (Pennsylvania Public School Code of 1949). As discussed in the *Qualitative Study Results* sub-chapter, s*chool board* was mentioned frequently by qualitative study participants in reference to decision-making and policymaking. The school board makes final decisions about curriculum, hiring, budgeting, disciplinary action, and other

matters. This political structure places the school district superintendent in the role of mediator *between* the school board *and* school administrators, faculty, and staff. Second, pragmatically, school districts employ many individuals charged with implementing the public mandate to educate K-12 schoolchildren across grades and abilities. The myriad levels and working parts of a school system necessitate a collaborative work environment, where cooperative activities like consultation and committee work are common. This inclination to collaborate may also reflect American school culture in which learning from and working with others are valued.

Knowledge of both the content *and* the context of school district superintendents and school principals' decisions directly aided in formulation of the quantitative survey-in-the-field instrument. Notably, five of the six decision scenarios included cognitive biasing statements that centered on input from others or what is typical of other organizations' policies, in cases where qualitative data suggested decisions are typically made collaboratively, or in reference to others or to policy (e.g., budgeting, personnel discipline, curricular policy). By contrast, the personnel evaluation decision scenario included a cognitive biasing statement centered on a decision made in isolation, as qualitative data suggested that personnel evaluations are typically performed by the supervisor alone. Justification for inclusion of specific decision sub-domains in quantitative survey-in-the-field decision scenarios is elaborated in the *Qualitative Study Results* section of Chapter IV.

Interpretation of Quantitative Data Findings for Personnel Management Decision-Making

This section delineates an interpretation of findings across the anchoring bias decision scenarios, which involved personnel management decisions. The decision sub-domains included personnel evaluation, personnel communication policymaking, and personnel discipline policymaking. The findings reported on the influences of high anchoring and low anchoring bias,

the influence of a consider-the-opposite (COS) debiasing intervention on high anchoring bias and low anchoring bias, and the relationship between COS debiasing feedback quality and COS interventional influence.

Significant Influence of Anchoring Bias Evidenced in Personnel Management

High anchoring bias and low anchoring bias significantly influenced school district superintendents' and school principals' decision-making in personnel evaluation, personnel communication policy, and personnel discipline policy. For each decision scenario, mean differences between high anchoring bias and low anchoring bias control groups were statistically significant and with large to very large effect sizes. As discussed in the *Quantitative Study Results Subchapter,* personnel evaluation and personnel communication policy decision scenarios were partially replicated designs. Although this study employed less extreme anchor values in those two decision scenarios, effect sizes were comparable to or larger than seen in prior studies.

Mixed Influence of Consider-the-Opposite Debiasing Evidenced in Personnel Management

The consider-the-opposite (COS) debiasing intervention significantly mitigated two of three high anchoring bias instances, and two of three low anchoring bias instances. For the other high anchoring bias and low anchoring bias instances, the COS debiasing intervention had no significant effect. In fact, control vs. intervention group means were in the opposite direction than was hypothesized. This evidence indicates that the COS debiasing intervention is not effective across all personnel management decisions observed in this study. Furthering this interpretation, COS debiasing feedback quality and participant age significantly predicted COS interventional influence in half the anchoring bias instances, sometimes simultaneously,

sometimes not. Given the novel quality rating scale employed to code COS debiasing feedback quality, inaccurate ratings could have altered the results found.

Personnel Evaluation Decision-Making

For personnel evaluation, the COS debiasing intervention significantly mitigated high anchoring bias with a very large effect size. The effect size is slightly lower than Nagtegaal and colleagues' (2020) study, which elicited two consider-the-opposite reasons related to the high anchor prompt (e.g., why the anchor value was inappropriate) and resulted in an extremely large effect size.

Further, as only evaluated in this study, COS feedback quality and participant age significantly predicted COS interventional influence on high anchoring bias, where both variables significantly predicted COS interventional influence. In other words, the higher the COS feedback quality and participant age, the lower the mean intervention group response.

By contrast, for personnel evaluation, the COS debiasing intervention had no effect on low anchoring bias, as the mean intervention group response was slightly lower, not higher, than the mean control group response. In Nagtegaal and colleagues' (2020) study, the COS debiasing intervention significantly mitigated low anchoring bias, although with a small effect size. Still, COS feedback quality, but not participant age, significantly predicted the COS interventional influence on low anchoring bias. In other words, the higher the COS feedback quality, the higher the mean intervention group response.

Further replication is needed to generalize whether a COS debiasing intervention is effective in personnel evaluation, which is susceptible to anchoring bias due to the presence of an anchor value: the employee's prior year evaluation score.

Personnel Communication Policymaking

For personnel communication policymaking, the COS debiasing intervention had no significant effect on high anchoring bias. The mean intervention group response was in fact higher, not lower, than the mean control group response. As discussed in the *Quantitative Study Results* sub-chapter, a different measurement (hours, not days) was employed, and extremeness of high anchor value (72 hours vs. 90 days) as compared to Nagtegaal and colleagues' (2020) study. Although the replicated study observed the intended COS debiasing intervention influence, the high anchor value prompt (90 days) was far more extreme than in this study (72 hours), yet the effect size was small (Nagtegaal et al., 2020).

As only evaluated in this study, participant age, but not COS feedback quality, significantly predicted the COS interventional influence on high anchoring bias. In other words, the higher the participant's age, the lower the mean intervention group response. By contrast, for personnel communication policymaking, the COS debiasing intervention significantly mitigated low anchoring with a very large effect size.

The effect size in this study is much larger than Nagtegaal and colleagues' (2020) study, which elicited two consider-the-opposite reasons related to the low anchor prompt (e.g., why the anchor value was inappropriate) and resulted in a small effect size. As only evaluated in this study, both COS feedback quality and participant age significantly predicted the COS interventional influence on low anchoring bias. In other words, the higher the COS feedback quality and participant's age, the higher the mean intervention group response. Further replication is needed to generalize whether a COS debiasing intervention is effective in personnel communication policymaking when an anchor value is present.

Personnel Discipline Policymaking

For personnel discipline policymaking, the COS debiasing intervention significantly mitigated low anchoring bias and high anchoring bias. However, the effect sizes were medium for both control vs. intervention groups comparisons. Neither COS feedback quality nor participant age predicted significantly the COS interventional influence on high anchoring bias and low anchoring bias. This could account for the medium effect sizes. Since this decision scenario was a novel design, replication is needed to generalize whether a COS debiasing intervention is effective in personnel discipline policymaking when an anchor value is present.

Results vis-à-vis Anchoring Bias in the Public Administration Literature.

These results add to empirical evidence that anchoring bias influences personnel management decision-making. The behavioral public administration literature demonstrates evidence of anchoring bias in personnel evaluation (Battaglio et al., 2018; Bellé et al., 2017; Bellé, Cantarelli, & Belardinelli, 2018; Cantarelli et al., 2020; Nagtegaal et al., 2020) and in personnel communication policy (Bellé, Cantarelli, & Belardinelli, 2018; Nagtegaal et al., 2020). On the other hand, there is a yet underdeveloped literature on the influence of a consider-the-opposite (COS) intervention strategy on anchoring bias in public administration.

As discussed in foregoing sections, Nagtegaal and colleagues (2020) employed a similar COS interventional strategy, and although they found a significant mitigation influence for all decisions evaluated, results for effect sizes were mixed. Nevertheless, the intervention strategy for anchoring bias utilized in this study and by Nagtegaal and colleagues' (2020) were found more effective than the Cantarelli and colleagues' (2020) study, which employed a warning type intervention strategy that did not mitigate the influence of anchoring bias in personnel evaluation decisions when the employee's prior year evaluation score served as an anchor value.

In addition, no prior experimental study has evaluated any cognitive bias in personnel discipline decision-making, a likely more complex decision-making process than for personnel evaluations and personnel communication policymaking, due to the ethical and legal complexities involved in personnel misconduct. Even so, anchoring bias influenced personnel discipline policymaking at the same significance level as—but with a larger effect size than—the anchoring bias influence on personnel evaluations and personnel communication policymaking. At the same time, the COS intervention strategy mitigated both high and low anchoring bias in personnel discipline policymaking, although in neither instance did COS debiasing feedback quality significantly predict the interventional influence.

Interpretation of Quantitative Data Findings for Organizational Policymaking

This section delineates an interpretation of findings across the attribute framing bias decision scenarios, which involved organizational policymaking decisions. The decision sub-domains included curricular policymaking, student policymaking, and budget policymaking. The findings reported on the influences of positive framing bias and negative framing bias, the influence of a consider-the-opposite (COS) debiasing intervention on positive framing bias and negative framing bias, and the relationship between COS debiasing feedback quality and COS interventional influence.

Significant Influence of Attribute Framing Bias Evidenced in Organizational Policymaking

Positive framing bias and negative framing bias significantly influenced school district superintendents and school principals' decision-making for curricular policymaking, student policymaking, and budget policymaking. For each decision scenario, mean differences between positive framing bias and negative framing bias control groups were statistically significant,

where one comparison had a medium effect size and two comparisons had very large effect sizes. Since all three attribute framing decision scenarios were novel designs, replication is needed to generalize whether attribute framing bias influences decision-making in curricular policymaking, student policymaking, and budget policymaking, which are unique to K-12 public education administration.

Mixed Influence of Consider-the-Opposite Debiasing Evidenced in Organizational Policymaking

The consider-the-opposite (COS) debiasing intervention significantly mitigated two of three positive framing instances, and one of three negative framing bias instances. For the other positive framing bias instance, the COS debiasing intervention had a negligible effect. For the other negative framing bias instances, the interventional influence was either non-significant or far in the opposite direction than was hypothesized. Therefore, the COS debiasing intervention is not effective across all observed organizational policymaking decisions. Furthering this interpretation, COS debiasing feedback quality significantly predicted COS interventional influence in all three positive framing bias instances, but in only one negative framing bias instance. As mentioned for personnel management above, given the novel quality rating scale employed to code COS debiasing feedback quality, inaccurate ratings could have altered the results found. Of note, participant age did not significantly predict COS interventional influence for attribute framing bias at all.

Curricular Policymaking

For curricular policymaking, the COS debiasing intervention significantly mitigated positive framing bias with an extremely large effect size. COS feedback quality, but not participant age, significantly predicted COS interventional influence on positive framing bias. In

other words, the higher the COS feedback quality and participant age, the lower the mean intervention group response.

By contrast, the COS debiasing intervention had an opposite effect on negative framing bias. In fact, the mean intervention group response was far lower, not higher, than the mean control group response. Not surprisingly, COS debiasing feedback quality could not be evaluated for negative framing bias, because the variable did not increase in a linear fashion across quality rating groups. Uneven quality of COS feedback could have influenced the non-debiasing effect observed here for negative framing bias.

Since this decision scenario was a novel design, replication is needed to generalize whether a COS debiasing intervention is effective in curricular policymaking when information is framed positively or negatively for K-12 public education administrators.

Student Policymaking

For student policymaking, the COS debiasing intervention significantly mitigated positive framing bias and negative framing bias. Although the interventional influence on positive framing bias had a very large effect size, the interventional influence on negative framing bias had a medium effect. COS feedback quality, but not participant age, significantly predicted COS interventional influence on positive framing bias and negative framing bias. Since this decision scenario was a novel design, replication is needed to generalize whether a COS debiasing intervention is effective in student policymaking when information is framed positively or negatively for K-12 public education administrators.

Budget Policymaking

For budget policymaking, the COS debiasing intervention had little effect on positive framing bias. The mean intervention group response was only slightly lower than the mean

control group response, and the effect size was very negligible. However, COS feedback quality, but not age, significantly predicted COS interventional influence on positive framing bias. By contrast, the COS debiasing intervention significantly mitigated negative framing bias with a very large effect size. However, COS debiasing feedback quality could not be evaluated for negative framing bias, because the variable did not increase in a linear fashion across quality rating groups.

Results vis-à-vis Attribute Framing Bias in the Public Administration Literature

These results add to empirical evidence that attribute framing bias influences organizational policymaking. The behavioral public administration literature demonstrates evidence of attribute framing bias on budgeting decisions (Berardinelli et al., 2018) and general organizational policymaking (Bellé, Cantarelli, & Belardinelli, 2018; Cantarelli et al., 2020). Meanwhile, results of this dissertation offer mixed evidence for the effectiveness of a consider-the-opposite debiasing intervention. Similarly, behavioral public administration research offers mixed evidence for the effectiveness of other debiasing intervention strategies to mitigate attribute framing bias, such as *ex ante* warnings about the bias in effect (Belardinelli et al., 2018; Cantarelli et al., 2020).

Cautiously speaking, positive framing bias might be more amenable to debiasing mitigation than negative framing bias. This could be explained by negativity bias, which induces a stronger reaction to negative information than does positive or neutral information, as found in prior research on attribute framing bias in general (Cheng et al., 2014) and on negativity bias in public education (Holm, 2017; Nielsen & Baekgaard, 2015; Nielsen & Moynihan, 2017). Furthering this interpretation, both attribute framing bias and negativity bias are driven by loss aversion bias (Battaglio et al., 2018), which may explain the interrelated effects.

Implications

Theoretical Implications

Bounded Rationality Theory

Bounded rationality theory provided a basis for the conception of this mixed-method dissertation study, which answered Simon's (1946; 1955) call for behavioral science research embedded in a political context. Simon (1985) later revised his theory by acknowledging that decision-making can be justifiable on political grounds even when it lacks logic and deliberation. Going further, Forester (1984) recognized four contexts of political decision-making: (1) cognitive limitations on the individual decision-maker (à la Simon); (2) multiple social spheres of decision-making; (3) pluralism of competing decision-makers; and (4) power-differentiated, information-asymmetric decision-making.

Considering this more nuanced theoretical framework, the quantitative survey-in-the-field was designed not only to prompt the influence of cognitive bias on the individual decision-maker. It also integrated the political context of K-12 public education in which administrators typically make decisions collaboratively, or in reference to others or to policy, as evidenced by the qualitative data analysis. Although decision scenarios contained biasing statements with arbitrary information, anchoring bias and attribute framing bias significantly influenced the decision-making of school district superintendents and school principals in all instances.

Prospect Theory and Behavioral Economics Theory

Like bounded rationality theory, prospect theory and behavioral economics theory were established in rejection of prescriptive decision-making models (Tversky & Kahneman, 1992). Therefore, this study aimed to describe the *actual* decision-making of school district superintendents and school principals both qualitatively and quantitatively. The quantitative

study was designed to observe the influence of attribute framing bias according to prospect theory, which explains that humans follow systematic patterns of decision-making due to loss aversion bias. Behavioral economics theory moves beyond bounded rationality theory and prospect theory to explain irrational decision-making in terms of the heuristics, or mental shortcuts, that humans employ intuitively to make more efficient decisions. Both anchoring bias and attribute framing bias are observable, measurable cognitive biases that stem from heuristics of accessibility bias and loss aversion bias, respectively (Kahneman, 2003, 2011, Kahneman & Tversky, 1979; Tversky & Kahneman, 1973, 1981, 1990).

The quantitative study was designed to observe the influence of anchoring bias and attribute framing bias. Three anchoring bias decision scenarios included statements containing an arbitrary anchor value intended to elicit accessibility bias, which influences people to focus on salient information. School district superintendents and school principals were significantly influenced by the low anchor or high anchor in all instances. Similarly, attribute framing bias decision scenarios included statements containing an arbitrary valence frame of information intended to elicit loss aversion bias, which influences the positive or negative perception of a choice. School district superintendents and school principals were significantly influenced by the positive frame or negative frame in all instances.

Dual Process Theory and Nudge Theory

Dual process theory aided the conceptualization of cognitive bias and debiasing in this study, providing an explanatory framework for *System 1* vs. *System 2* cognitive processing (Crosskery et al., 2013a; Evans & Stanovich, 2013: Kahneman, 2003, 2011). Nudge theory extends dual process theory to posit that debiasing interventions that initiate deliberative *System 2* cognitive processing could be employed to overcome immediate *System 1* processing that leads

to cognitively biased decision-making (Thaler & Sunstein, 2021). According to these theories, the quantitative study was designed to evaluate the effectiveness of a consider-the-opposite (COS) debiasing intervention strategy. This strategy was hypothesized as an *ex post* intervention (Kahneman et al., 2021) that would encourage decision-makers to slow down and consider why others might challenge their decision, thereby mitigating the influence of anchoring bias or attribute framing bias. Returning to this study's theoretical origin, as for *un*bounding the rationality of K-12 public education administrators, the COS debiasing intervention strategy mitigated cognitive bias in eight of 12 decision-making instances, while COS feedback quality predicted the COS interventional influence in seven of 12 decision-making instances.

Practical Implications

The quantitative study was conducted in a controlled, laboratory-like setting which lacked real-world context and consequences for decision-making. Nevertheless, although study participants were exposed to arbitrary biasing statements, anchoring bias and attribute framing bias significantly influenced the decision-making of school district superintendents and school principals in all instances. Moreover, the consider-the-opposite (COS) debiasing intervention strategy was successful about 67% of the time. COS feedback quality predicted COS interventional influence about 60% of the time overall, although participant age predicted COS interventional influence 50% of the time for anchoring bias and never for attribute framing bias.

These outcomes were limited to a quasi-experimental context, yet the qualitative data analysis revealed that school district superintendents and school principals operate in a highly collaborative context, which might dispose these administrators to a consider-the-opposite mindset. This could explain the partial success of the COS debiasing intervention as observed in the quantitative study. Indeed, the K-12 public education sector may be a model for collaborative

decision-making and offer opportunities to implement larger-scale debiasing practices, as discussed in *Recommendations for Public Administration Practice* below.

Limitations

This research study was not without limitations, as confounding variables and a suboptimal research design posed several limitations discussed herein. Even so, such limitations could inform further experimental study of cognitive biases and debiasing intervention strategies, as elaborated in the subsequent *Recommendations for Public Administration Research* section.

Confounding Variables

As with operationalization and measurement of any abstract psychological phenomena, it is impossible to guarantee elicitation of cognitive bias under experimental conditions. Furthermore, it is difficult to isolate a single cognitive bias in experimental studies, since in the real world, multiple cognitive biases may exert influence together (Crosskery et al., 2013a; 2013b). Finally, as for independent and dependent variables selected for any experimental study, there might be confounding variables that influence the dependent variable (Newton & Rudestam, 2013). To address this final point, the quantitative study was designed in anticipation of covariate influences. The survey-in-the-field instrument collected data on participant characteristics, several of which were found to be significantly different between participant groups. For the four anchoring bias groups, covariates of age, total years in any K-12 public education administration position, and school district size were found to be significantly different. For the four attribute framing bias groups, covariates of age, total years in any K-12 public education administration position, and education level were found to be significantly different. Ultimately, as discussed in the Chapter IV, only the covariate of age was included in multiple regression modeling for anchoring bias and attribute framing bias, to determine whether

participant age and consider-the-opposite (COS) debiasing feedback quality predicted COS interventional influence.

Internal Confounding Variables

Internal confounding variables may have involved other cognitive biases (e.g., not anchoring bias or attribute framing bias) or additional cognitive biases which influenced a study participant's tendency toward *System 1* cognitive processing. For example, over-confidence bias could have influenced study participants because the survey-in-the-field lacked real-world consequences, thereby inducing moral hazard (i.e., increased risk-taking as accountability decreases). Isomorphism bias could have influenced study participants to respond in alignment with information about what is typical of peer organizations, as noted in several decision scenario biasing statements. Status quo bias could have influenced study participants to support a policy that mimics what their school district already has in place, or to not support a policy because it does not mimic their school district's policy.

External Confounding Variables

External confounding variables in the quantitative study may have included time pressure, as 15-20 minutes to decide on decision scenarios would be abnormal, especially for intervention group participants, who had to produce two consider-the-opposite reasons on the spot. Also confounding results could have been distractions or interruptions to study participants while responding to the survey. Moreover, realistic decision scenarios are inevitably more complex than this survey-in-the field evaluation could feasibly measure. By definition, however, a survey-in-the-field strikes a balance between realism and practicality. Study participants were unpaid volunteers that were assumed to lack the time, energy, and motivation required for more

demanding survey content. Excess survey complexity or time demands could have resulted in participants' inadequate effort or failure to complete the survey.

Other Confounding Variables

Another confounding variable may have resulted from sampling bias due to inequitable representation of superintendents versus principals between the two intervention group samples. Table 18 displays the participant data discussed herein. The anchoring bias intervention group sample was drawn from the Pennsylvania Principals Association. The sample comprised eight superintendents, 10 assistant superintendents, 35 principals, and eight assistant principals. By contrast, the attribute framing bias intervention group sample was drawn from the Pennsylvania Association of School Administrators. The sample comprised 35 superintendents, 13 assistant superintendents, 11 principals, and two assistant principals. Not surprisingly, the mean participant age and *total years* in K-12 public education position(s) for the anchoring bias intervention group (mean age = 52.8; *total years* = 13.6) was lower than for the attribute framing bias intervention group (mean age = 58.1; *total years* = 18.6), given the higher ratio of superintendents to principals in the latter intervention group.

Table 18. Descriptive Statistics for K-12 Public Education Administrators

Sample Subgroup	**Control Group**	**Anchoring Bias Intervention Group**	**Attribute Framing Bias Intervention Group**
Variable	*n* (%)	*n* (%)	*n* (%)
Current Position			
Superintendent	22 (12.4)	8 (13.1)	35 (57.4)
Assistant Superintendent	35 (19.7)	10 (16.4)	13 (21.3)
Principal	80 (45.0)	35 (57.4)	11 (18.0)
Assistant Principal	41 (23.0)	8 (13.1)	2 (0.03)
Subgroup Total	**178**	**61**	**61**
	Mean (SD)	*Mean (SD)*	*Mean (SD)*
Years in K-12 Public Education Administration Position(s)	13.7 (7.3)	13.6 (3.9)	18.6 (5.1)

Age	48.5 (7.8)	52.8 (7.7)	58.1 (5.0)

On one hand, as discussed earlier in this chapter, age and *total years* were found to be statistically significant covariates, where age and *total years* significantly correlated with each other, and age was more significantly different than *total years* between the participant groups. Age was therefore selected as a covariate in multiple regression analysis of the relationship between consider-the-opposite (COS) feedback quality and COS interventional influence. On the other hand, age was not included as a covariate in the between-groups means testing. Rather than employ an ANCOVA or multiple regression model, independent samples t-tests were utilized in order to replicate prior studies which did not include any covariates in the means analysis.

In instances where study participant characteristics like age, current position, and total years in administration practice, which are interrelated, it is important to consider including at least one covariate proxy in the statistical analysis to account for participant characteristics that might confound results. Although participant age rarely predicted COS interventional influence, it may have made a significant difference to between-groups means analyses. Ultimately, quantitative study results may have been confounded because more seasoned study participants—those who were older, in higher-level positions, and/or in practice for a longer time—may have developed a debiasing mindset (e.g., taking time to deliberate) that could have influenced decisions in the survey-in-the-field. In other words, intervention group participants may have been influenced as much by their own decision-making skill as by the COS interventional influence, thereby confounding the validity of results for COS interventional effectiveness.

Suboptimal Research Design and Researcher Limitations

The primary study limitation relates to the sample and timing for qualitative data and quantitative data collection. The data collection periods occurred during the peak of the COVID-19 pandemic, from August 2021 to March 2022. During the 2021-22 school year in Pennsylvania, school mask mandates and remote schooling became divisively controversial. These distractions and pressures likely presented barriers to quantitative data collection from January to March 2022, as elaborated in the *Quantitative Methodology Subchapter.* As a result, to maximize participation in the quantitative study, a quasi-experimental design was utilized.

The quasi-experimental design might have introduced sampling bias into the quantitative study. For practical reasons, as discussed in the *Quantitative Methods Subchapter*, the quantitative study sampling procedure was divided into three strands. The first strand of sampling was randomized for recruitment of control group participants, in which prospective participants were contacted directly by email via Qualtrics survey software. By contrast, the second and third strands of sampling involved as much convenience as randomization for recruitment of intervention group participants. This was due to a concern that a full intervention group survey-in-the-field—all six decision scenarios plus consider-the-opposite tasks for each—would cause survey completion failure. Hence, the intervention group survey-in-the-field was split into two instruments, one for each cognitive bias. The anchoring bias survey-in-the-field was distributed by the Pennsylvania Principals Association (second strand), and the attribute framing bias survey-in-the-field was distributed by the Pennsylvania Association of School Administrators (third strand). It was expected that the professional organizations would lend credibility to the research purpose, thereby encouraging members to open the research invitation email and complete the intervention group survey-in-the-field.

In addition, the quantitative study design was quasi-experimental due to the lack of randomization within the survey-in-the-field instrument. On one hand, Qualtrics survey software was utilized to randomize participants into low or high anchoring bias groups for each anchoring bias decision scenario, and into positive or negative framing bias groups for each attribute framing bias decision scenario. On the other hand, the order of decision scenarios was the same in all surveys-in-the-field for the control and intervention groups (Appendix G). Ordering effects could have altered decision-making as participants progressed through the survey, particularly for control group participants, who were exposed to both anchoring bias and attribute framing bias. Still, for ease of reading and following instructions, the order of decision scenarios was kept constant. Future researchers should bear this in mind when designing a study that observes more than one cognitive bias, or that includes more than one decision scenario per cognitive bias.

Another limitation entailed the researcher working solo to analyze the qualitative data, as expected for a dissertation on which the student works alone. In certain instances, qualitative coding is ideally performed by multiple researchers in order to increase the reliability of results, although caution should be taken where multiple coders might confuse the interpretation (Bazeley, 2021). When a single researcher codes qualitative data, the reliability of results lies in a strong, well-reasoned interpretation (Bazeley, 2021), as was endeavored in this study. For coding the qualitative interview data in the first-stage qualitative study, other coders might interpret more or less nuance from the data, and they might choose different decision scenario topics to include in the quantitative survey-in-the-field. Quantitative rating of qualitative data, on the other hand, would very likely benefit from multiple raters (Black, 1999). For rating the consider-the-opposite (COS) feedback quality in the second-stage quantitative study, multiple raters might collaborate to devise a different rating scale with more nuanced criteria, and they might produce

varying COS feedback quality ratings. As such, future researchers should bear in mind the advantages and drawbacks to employing multiple coders or raters of qualitative data.

Recommendations

Recommendations for Public Administration Research

These limitations acknowledged, it is worth evaluating the influence of cognitive bias and debiasing intervention strategies in public administrator decision-making. Fair, responsible, and well-reasoned public administrator decision-making may in part depend on it. The following research recommendations seek to address and move beyond some of the limitations discussed above.

Cognitive Bias Typologies as Basis for Research Design

Of practical use for study replication is looking to latent cognitive bias typologies as a basis for comparison within and between typologies, which are frameworks for categorizing cognitive biases according to the latent heuristics underlying the biases. Battaglio and colleagues' (2018) systematic review article includes a useful table of prior cognitive bias experimental studies that displays three latent heuristics—accessibility, loss aversion, and over-confidence—across which 23 cognitive biases are categorized. Included for each research study is valuable information like the research design, unit of analysis (target sample), sample size, decision domain, outcome variable(s), and estimated effect on outcome. Indeed, the public administration literature on cognitive bias and debiasing offers a basis for replication, and the momentum established by behavioral public administration researchers can be impactfully advanced. For instance, researchers could draw upon prior studies to select a decision domain or debiasing intervention strategy to evaluate in future studies. However, there is a relative lack of studies

focused on samples of public administrators, as contrasted with many more studies focused on samples of citizens and non-administrator public employees (Battaglio et al,, 2018).

Multiple Researchers to Increase Reliability and Pilot Study to Increase Validity

Future researchers could take steps to increase the reliability of results, survey-in-the-field instrument, and consider-the-opposite feedback quality rating scale. As discussed in *Limitations* above, this study was conducted by the student alone. Ideally, multiple researchers would collaborate to analyze the qualitative data from both the qualitative and quantitative studies. As for coding of data from the qualitative interviews, additional researchers would at least provide a check on the principal researcher's data analysis, although too many coders of qualitative data might undermine the interpretation (Bazeley, 2021). As for rating consider-the-opposite feedback quality, additional researchers would increase the reliability of the quality rating scale and the ratings themselves, where reliability could be evaluated such as by observing the correlation between all researchers' ratings (Black, 1999).

Moreover, limited time for data collection constrained this dissertation research design to two stages: qualitative interviews and quantitative surveys-in-the-field. A more valid research design would entail a pilot study of the quantitative data collection instrument (Black, 1999). Pilot study results could provide the researcher with feedback about the quantitative survey-in-the-field in terms of content and context relevance, clarity of instructions, ease of reading the decision scenarios, and time taken to complete the survey. The pilot study could be conducted with the same participants as in the qualitative study, although the researcher should withhold the ultimate quantitative study purpose (e.g., observing cognitive bias) during the qualitative study and pilot study stages, revealing the purpose when debriefing pilot study participants.

Replication in K-12 Public Education and Extension to Other Public Sectors

This study could serve as a model for replication. Future studies in K-12 public education administration could replicate the decision scenarios, consider-the-opposite (COS) debiasing intervention strategy, and COS feedback rating scale. Novel decision scenarios could also be developed based on the qualitative data, which elucidates decision-making in many areas within sub-domains. Moreover, because this study partially replicated prior studies, future researchers could partially replicate this study's research design aiming to observe and/or mitigate anchoring bias and attribute framing bias in decision domains of personnel management and organizational policymaking as applicable to other public sectors.

Further replication is needed also because experimental studies on cognitive bias in behavioral public administration have employed varying designs. These designs vary in terms of construct measurement, the number or combination of cognitive biases observed, more or fewer decision scenarios per bias, and the type of debiasing intervention strategy (Battaglio et al., 2018). Even so, experimenting with a variety of different cognitive biases and construct measurements can be fruitful (Bellé et al., 2017). This is also true of comparing the influences of various debiasing intervention strategies, and evaluating the quality of COS debiasing feedback. Such research efforts would build upon the empirical generalizability regarding the influence of cognitive bias in certain decision domains, as well as the effectiveness of COS debiasing intervention strategies, and the relationship between COS debiasing feedback quality and interventional effectiveness.

Go Beyond an Electronic Survey-in-the-Field

For practical reasons, this study was conducted electronically utilizing email and Qualtrics survey software. For researchers who have the time and resources, an in-person mixed-

methods study could capture more data (e.g., more decision scenario responses) and allow for a more intensive consider-the-opposite (COS) debiasing procedure. For the qualitative study, participants could be interviewed in a focus group format in addition to structured written interviews. For the pilot study, participants would be more interactive and provide more nuanced feedback about the pilot survey-in-the-field instrument. For the quantitative study, participants would be given more time and have more focused attention to complete responses to decision scenarios, and they could be asked to provide more than two COS feedback statements (e.g., reasons why others might challenge their decision).

Obtain Adequate, Representative Quantitative Study Sample

Obtaining an adequate, representative study sample is normally the aim of experimental research, although these standards are sometimes violated without due reflection on the limitations (Black, 1999; Newton & Rudestam, 2013). Future replication of this study should consider methods to overcome limitations due to confounding variables and a suboptimal research design, as discussed earlier in this chapter. First, an experimental design that involves randomization of all participants could offset confounding variables such as sampling bias. Second, casting a wider net for data collection would increase the study sample size, as opposed to this quantitative study for which survey response rates were low. Third, even without significant barriers to data collection as encountered in this study, a replication study would benefit from a longer period of data collection. This would allow for an adequate sample size in addition to periodic checks for representativeness of the study sample vis-à-vis the target population.

Seek Grounded Theories of Decision-Making and Debiasing

Building on the results of this study, an interesting mixed-method study, for example, could entail comparison of public administrators' openness to varying debiasing strategies between sectors, where certain sectors are identified as collaborative versus individualistic through preliminary qualitative data analysis. One could ask: *Does the decision-making context influence the debiasing strategy employed?* Knowledge of public administrators' strengths or limitations in decision-making could reveal other types of debiasing strategies, leading to grounded theories of decision-making and cognitive debiasing. As argued here, public administrators' decision-making should be observed in the context in which decisions are made. It is likely that certain debiasing strategies work better in certain decision-making contexts than others. Future research could make important discoveries to this end.

Recommendations for Public Administration Practice

Debiasing as a Routine Organizational Practice and Mindset

Promisingly, as the qualitative data suggest, K-12 public education administrators operate in highly collaborative contexts. Over time, this political-institutional context likely disposes school district superintendents and school principals to eliciting and considering others' viewpoints. This in turn might predict the success of consider-the-opposite and other debiasing practices on a larger, longer-term scale. On the organizational level, these administrators could be trained in the cognitive bias phenomena by utilizing latent cognitive bias typologies as a framework for understanding which latent heuristic drives certain cognitive biases (e.g., loss aversion drives attribute framing bias and negativity bias) (Battaglio et al., 2018). The logical next step is implementing debiasing intervention strategies as a regular organizational practice and mindset.

Practically speaking, debiasing interventions implemented on the organizational level tend to be more successful when they are easily recalled, specified for the context, implemented in a group setting, and co-created by the decision-makers themselves (Heath et al., 1998). In other words, a debiasing intervention must not only be effective in its content and relevance, but also made palatable to the decision-maker by maximizing buy-in and minimizing ego threat (Heath et al., 1998). Furthermore, behavioral public human resource theory proposes that potential for debiasing can be actualized to improve decision-making in personnel evaluation and organizational policymaking (Cantarelli et al., 2020). Whether immediate, one-time debiasing interventions have lasting effects is questionable (Arkes, 1991). Still, if these interventions are implemented in stepwise fashion and as ongoing organizational practices and procedures, there is potential for longer-term mitigation of cognitive bias in decision-making (Crosskery et al., 2013a; Heath et al., 1998).

Any of various consider-the-opposite debiasing interventions, even a consider-the-opposite mindset, could be modeled and instilled on the organizational level. The goal is to habituate decision-makers to practices of checking oneself and one another, and of engaging in effortful deliberation. Consider-the-opposite questioning could become routine habits for individuals and points of discussion among colleagues or collaborating groups. For anchoring bias, by example, one could ask:

1. *Are you using this employee's prior year evaluation as a reference point for this year's evaluation?*
2. *Are you basing this decision on the first piece of information you noticed?*
3. *Are you considering all factors that could influence this decision, not only factors from your professional experience?*

4. *Are you considering the average occurrence of this behavior (e.g., employee sexual misconduct), or is a rare but recent occurrence (e.g., employee charged with sexual harassment) now salient in your decision-making calculus?*

For attribute framing bias, by example, one could ask:

1. *Is the framing of this budget proposal influencing your perception?*
2. *What are the pros and cons of this budgeting decision?*
3. *While you focus on the positive impacts of this policy option, are you neglecting the negative impacts? (or vice versa)*
4. *Could you reframe this policy option to reconsider its impact?*

Such lines of consider-the-opposite questioning could be co-developed by the groups of individuals who make these decisions collaboratively, whether as a team of colleagues or among differing levels of decision-makers. Questions would be specified to the decision sub-domain at hand and to the context in which such decisions are made. As mentioned earlier, the greater the relevance to and buy-in for decision-makers, the more motivated decision-makers will be to adopt debiasing procedures as a routine practice.

Conclusion

Given the limits of theory, as Herbert Simon (1946, 1985) would have agreed, researchers should be wary of the epistemological limits of empirical research to reify cognitive bias into an observable phenomenon, much less a mitigatable one. Dual process theory, for instance, is itself a heuristic explanation for how cognitive bias operates, that is, a shortcut to describe an exceedingly complex neurological process for which a binary construct (*System 1* vs. *System 2*) only *satisfices* (à la Simon) for the purposes of empirical research. Yet, as cognitive biases like anchoring bias and attribute framing bias are evidenced to be not only commonplace, but also

measurable (Kahneman, 2011), researchers should strive to operationalize and isolate these cognitive biases in experimental research to find ways to mitigate the adverse consequences on public administrator decision-making.

As Weinstein (2003) writes about the everyday influence of cognitive bias, "we should not believe everything we think, but we should believe much of what we think, especially if we develop the habit of checking up on ourselves" (p. 834). Debiasing interventions could thus serve as self-check habits that are worthwhile to evaluate as interventional variables in behavioral public administration research. Some researchers have proposed that debiasing interventions developed and propagated on a large scale could be a boon for society (Lilienfeld et al., 2009). This dissertation study was undertaken with a like optimism for the potential positive impact of behavioral public administration research on real-world decision-making practices. Its aim was to integrate and advance the literature on cognitive bias and debiasing interventions, and to apply findings to improve decision-making that affects public organizations, public employees, and the public interest.

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Appendices

Appendix A: Study Invitation Email Message (Qualitative Study)

Greetings:

I'm studying in the **Doctor of Public Administration** program at West Chester University. I am preparing to collect data for my **dissertation research on decision-making by K-12 public education administrators**. The research sample will consist of currently practicing administrators – specifically, administrators who make decisions in 2 domains as noted below.

I will collect data with an online "survey-in-the-field" containing decision scenarios for participants to respond to. The research design replicates quantitative experimental studies in public administration. This will be the first study conducted in the public education sector in Pennsylvania.

To ensure research validity (i.e., creating decision scenarios relevant to research participants), **I am conducting this survey to gather information from former administrators** about the types of decisions made in domains of: **personnel management** and **organizational policymaking.**

The following link leads to an online survey questionnaire. You may want to type your responses separately and then paste them into the survey. In the online format, you cannot view what you have written as a whole.

Many thanks in advance for taking time to respond to my questions. Your responses need not be exhaustive. Several examples with some detail for each question would suffice, as I'm contacting a variety of former public education administrators for this initial information-gathering phase.

[Link to Decision-Making Survey for Former Administrators]

This research study has been **approved** by the **West Chester University** Institutional Review Board **IRB # 00005030.**

If you have questions about the dissertation research, you may reach me at

jm572052@wcupa.edu

Yours in public scholarship,

Julie K. Mesaros, Doctor of Public Administration Candidate

West Chester University of Pennsylvania

Appendix B: Informed Consent Statement (Qualitative Study)

Introduction

Greetings,

My name is Julie K. Mesaros. I am conducting written interviews for my dissertation in the **Doctor of Public Administration** program at West Chester University. I invite you to participate in the written interview, which will inform the content of my dissertation research survey on decision-making by K-12 public education administrators. Your contribution to this research effort not only supports my learning. It also adds to the body of leading-edge research in the public administration field.

Research Purpose and Design

The written interview purpose is exploratory. Participants include former K-12 public education administrators. Participants will be asked questions about the types of decisions they made in their public education administrator role(s).

Written interview participant responses will aid the researcher in crafting a research survey-in-the-field instrument that is relevant to the decision-making of currently practicing public education administrators. The purpose of this ultimate research study will be to observe decision-making of currently practicing public education administrators.

The written interview involves collecting qualitative open-ended text data using an online questionnaire.

Your Participation and Rights

I have contacted you because you held a position relevant to my ultimate research study, whose participants will include: school district superintendents and school principals in

Pennsylvania. The online written interview questionnaire will take you about 20-30 minutes to complete. Your participation is 100% voluntary. At any time, you have the right without penalty to: decline to participate or withdraw from the study.

Anonymity

You can begin the written interview questionnaire once you have submitted this consent form. The survey software employs an anonymous link. By clicking this link and later submitting the survey, there will be no trace of any personally identifying information.

Confidentiality

All data will be kept by the researcher on a password-protected computer and using password-protected software (Qualtrics survey software and SPSS statistical software). All data will be destroyed 3 years after the date of dissertation publishing per federal guidelines.

Minimal to No Risk of Harm

There are no anticipated risks of harm to you by participating in this qualitative research study.

What to Expect in the Focus Group Questionnaire

In the online interview questionnaire, you will be asked to provide feedback about the types of decisions you made as a K-12 public education administrator in personnel management and organizational policymaking. The overall results of this data analysis will be published in the dissertation, but there will be no connection to you personally.

Benefits

If you could lend your time for this focus group, I believe the public administration field will benefit from my dissertation research results. If you wish to access my dissertation results, kindly email me and I will be glad to send these to you.

Researcher Contact Information

If you have questions about the dissertation research, you may reach me at

jm572052@wcupa.edu

Yours in public scholarship,

Julie K. Mesaros

Doctor of Public Administration Candidate

West Chester University of Pennsylvania

Appendix C: Written Interview Questionnaire (Qualitative Data Collection Instrument)

1) In the domain of personnel management, what specific types of decisions did you make about people in **hiring?**

(e.g., whom you were responsible for hiring, what information did you use to make hiring decisions, how you decided among candidates with similar portfolios)

2) In the domain of personnel management, what specific types of decisions did you make about people in **evaluations?**

(e.g., whom you were responsible for evaluating, what inventory/s you used to evaluate personnel as with rating scales, what professional and personal qualities you evaluated)

3) In the domain of personnel management, what specific types of decisions did you make about people in **disciplinary action?**

(e.g., whom you were responsible for disciplining as needed, what levels of action could be taken, what evidence you required to make judgments)

4) In the domain of personnel management, what specific types of decisions did you make **apart from those mentioned above?**

5) In the domain of organizational policymaking, what specific types of decisions did you make in **personnel policies**?

6) In the domain of organizational policymaking, what specific types of decisions did you make in **student policies**?

7) In the domain of organizational policymaking, what specific types of decisions did you make in **curricular policies?**

8) In the domain of organizational policymaking, what specific types of decisions did you make in **budgeting (de facto policymaking)?**

9) In the domain of organizational policymaking, what specific types of decisions did you make **apart from those mentioned above?**

Appendix D: Participant Debriefing Statement (Qualitative Study)

This qualitative study was the first of two stages in a mixed-methods research study for my dissertation. This first-stage study aimed to gather information about types and examples of decisions that K-12 public education administrators make in domains of personnel management and organizational policymaking.

The information gathered from this qualitative study will be utilized in formulation of a quantitative data collection instrument for the second-stage study.

The second-stage study will observe the influence of cognitive bias, a phenomenon that can impede rational decision-making, from everyday choices to consequential decisions. Cognitive bias is often observed in decision domains of personnel management and organizational policymaking.

To my knowledge, this mixed-methods study is the first of its kind conducted on cognitive bias in K-12 public education administrator decision-making in the United States.

Appendix E: Study Invitation Email Message (Quantitative Study)

Greetings:

I invite you to participate in my **dissertation research survey**. My name is Julie K. Mesaros. I'm a **Doctor of Public Administration candidate** at West Chester University of Pennsylvania. My dissertation research centers on **decision-making by public education administrators.** Participation is **voluntary and anonymous**. The survey link **does not track** user information (email, IP address, etc.). The online survey takes about **8-10 minutes to complete**. Participants will respond to **brief decision scenarios** and **demographic questions.** The study sample includes current **superintendents and principals** (*head and assistant positions*) in **Pennsylvania**. The research design partly replicates experimental studies in public administration. **This study is *the first of its kind* in the public education sector in Pennsylvania.** This research study has been **approved** by the **West Chester University** Institutional Review Board **IRB # 00005030.**

The link below leads to the online survey. Prior to participating in the survey, you must agree to an informed consent statement. The informed consent statement is located in the online survey itself. **My sincere thanks if you choose to participate.** Feel free to contact me by email (below) with questions. You may also reply directly to this email. **Follow this link to the survey / Or copy and paste URL into your browser:** [URL]

Yours in scholarship,

Julie K. Mesaros, ***Doctor of Public Administration Candidate***

Department of Public Policy and Administration, **West Chester University of PA**

Email: JM572052@wcupa.edu

Appendix F: Informed Consent Statement (Quantitative Study)

Project Title: Observing and Mitigating Public Education Administrators' Cognitive Bias

Investigators: Julie K. Mesaros (Doctoral student); Amanda Olejarski, PhD (Dissertation advisor)

Project Overview:

Participation in this research project is voluntary. The research project is being conducted by Julie K. Mesaros as part of her doctoral dissertation in the Doctor of Public Administration program at West Chester University.

The purpose of this research survey is to conduct a randomized controlled experiment. Participants include current public education administrators. Participants will be asked questions in response to six decision scenarios related to public education administration. Participants will take about 8-15 minutes to complete this electronic survey. Survey timing depends on whether participants are in the control group or the experiment group.

Survey participant responses will aid the researcher to observe decision-making for her dissertation research. The research study includes currently practicing public education administrators in Pennsylvania. Specifically, these are principals, superintendents, and Intermediate Unit executive directors in head and assistant positions.

If you would like to take part, West Chester University requires that you agree to this consent form. To indicate your agreement, please click the "next" arrow located at the bottom of this screen.

You may ask Julie K. Mesaros any questions to help you understand this study. If you don't want to be a part of this study, it won't affect any services from West Chester University. If you choose

to be a part of this study, you have the right to change your mind and stop being a part of the study at any time.

1. **What is the purpose of this study?**

- The study purpose is to observe decision-making by currently practicing public education administrators. The research purpose is explanatory. Participants include current public education administrators. Participants will be asked questions about decision scenarios related to public education administration.

2. **If you decide to be a part of this study, you will be asked to do the following:**
    - Complete an electronic survey (via Qualtrics software)
    - This study will take about 8-15 minutes of your time.
3. **Are there any experimental medical treatments?**
    - No
4. **Is there any risk to me?**
    - None
5. **Is there any benefit to me?**
    - None
6. **How will you protect my privacy?**
    - Your records will be private. Only Julie K. Mesaros, Amanda Olejarski, and the university Institutional Review Board will have access to your responses.
    - Your identifying information will **not** be used in any reports.
    - Records will be stored:
    - Password Protected File/Computer
    - Records will be destroyed three (3) years after dissertation completion.

7. **Do I get paid to take part in this study?**
    - No
8. **Whom do I contact in case of research related injury?**
    - For any questions about this study, contact:
    - **Primary Investigator:** Julie K. Mesaros at 484-888-9705 or jm572052@wcupa.edu
    - **Faculty Sponsor:** Amanda Olejarski at 856-304-1487 or aolejarski@wcupa.edu
9. **What will you do with my Identifiable Information/Biospecimens?**
    - Not applicable.

For any questions about your rights in this research study, contact the Office of Research and Sponsored Programs, West Chester University, at 610-436-3557.

Appendix G: Survey-in-the-Field (Quantitative Data Collection Instrument)

Anchoring Bias Decision - Scenarios #1, 2, and 3

DECISION SCENARIO #1: PERSONNEL EVALUATION

Low Anchoring Bias: You're assessing a direct report on his/her annual evaluation. During the current evaluation year, this employee: (1) Met expectations on all professional skill criteria; (2) Exceeded expectations on all personal quality criteria; and (3) Achieved 2 of 3 self-appointed goals. On this employee's last annual evaluation, s/he received a total objective score of **57 out of 100**. **Question:** What total objective score would you assign this employee for the current year evaluation? (Please use the 0-100 slider to indicate your answer.)

High Anchoring Bias: You're assessing a direct report on his/her annual evaluation. During the current evaluation year, this employee: (1) Met expectations on all professional skill criteria; (2) Exceeded expectations on all personal quality criteria; and (3) Achieved 2 of 3 self-appointed goals. On this employee's last annual evaluation, s/he received a total objective score of **83 out of 100.** **Question:** What total objective score would you assign this employee for the current year evaluation? (Please use the 0-100 slider to indicate your answer.)

DECISION SCENARIO #2: PERSONNEL COMMUNICATIONS POLICY

Low Anchoring Bias: Prominent community members complain that calls and emails to school district offices are not answered promptly. You need to change your external communication policy to ensure prompt responses from district faculty and staff. "Within **12 hours**" is the typical phone/email response time required by school district policies across the state. **Question:** Within how many HOURS would you require faculty and staff to respond to

external communication (exclusive of holidays and weekends)? (Please use the 0-100 slider to indicate your answer.)

High Anchoring Bias: Prominent community members complain that calls and emails to school district offices are not answered promptly. You need to change your external communication policy to ensure prompt responses from district faculty and staff. "Within **72 hours**" is the typical phone/email response time required by school district policies across the state. **Question:** Within how many HOURS would you require your faculty and staff to respond to external communications (exclusive of holidays and weekends)? (Please use the 0-100 slider to indicate your answer.)

DECISION SCENARIO #3: PERSONNEL DISCIPLINE POLICY

Low Anchoring Bias: Recently in your school district, there were several publicized cases of educator misconduct toward students. The school board is urging administrators to tighten the leave of absence policy for suspended teachers. The typical leave of absence for suspended teachers is **3 days**. **Question:** How many DAYS would you set as a minimum leave of absence policy for teacher suspension? (Please use the 0-100 slider to indicate your answer.)

High Anchoring Bias: Recently in your school district, there were several publicized cases of educator misconduct toward students. The school board is urging administrators to tighten the leave of absence policy for suspended teachers. The typical leave of absence for suspended teachers is **30 days**. **Question:** How many DAYS would you set as a minimum leave of absence policy for teacher suspension? (Please use the 0-100 slider to indicate your answer.)

Consider-the-Opposite Debiasing Intervention for Anchoring Bias

The consider-the-opposite debiasing intervention consisted of explicit anchoring adjustment. Prior to responding to each decision scenario question, intervention group participants were asked to explicitly adjust the anchor value by stating (typing) two reasons why the given value is not appropriate. Prior to viewing the anchoring bias scenarios, intervention group participants were provided with these instructions:

INSTRUCTIONS: Before indicating your answer, please provide two (2) reasons why others might challenge your decision.

EXAMPLE (Not included in this dissertation study):

Anchoring Bias Statement: Typical remediation training time for underperforming faculty is **2 hours** per year.

Question: How many HOURS would you set as the minimum hours per year that underperforming faculty must attend remediation training?

Tentative Decision: 5 hours.

Reason #1 to Challenge: 2 hours of training is not enough to resolve most faculty remediation issues.

Reason #2 to Challenge: Each faculty member is unique and may require more than the typical training time.

Attribute Framing Bias - Decision Scenarios #1, 2, and 3

DECISION SCENARIO #1: CURRICULAR POLICY

Positive Framing Bias: You're collaborating with the elementary curriculum and instruction committee to review policies. You learn from committee members about recent longitudinal research validating that low-income 3rd-graders benefit the most from a 16:1 student-teacher ratio. Key outcome variables are 8th-grade PSSA scores and college matriculation rates. **4 of 6** committee members **agree** that your 3rd-grade regular classrooms should be gradually reduced to a 16:1 ratio. **Question:** Assuming no budgetary constraints, how likely are you to support this policy change? (Please use the 0-100 slider to indicate the likelihood.)

Negative Framing Bias: You're collaborating with the elementary curriculum and instruction committee to review policies. You learn from committee members about recent longitudinal research validating that low-income 3rd-graders benefit the most from a 16:1 student-teacher ratio. Key outcome variables are 8th-grade PSSA scores and college matriculation rates. **2 of 6** committee members **disagree** that your 3rd-grade regular classrooms should be gradually reduced to a 16:1 ratio. **Question:** Assuming no budgetary constraints, how likely are you to support this policy change? (Please use the 0-100 slider to indicate the likelihood.)

DECISION SCENARIO #2: STUDENT POLICY

Positive Framing Bias: In a financial audit, the business manager finds that student meal programs in your school district lost about $150,000 over the past 3 years. The school board is taking strong issue with these revenue losses. The board president has proposed a policy solution: Mandate cafeteria workers to serve cheaper meals to students whose families have

outstanding meal debt. **6 of 9** school board members **agree** with this policy proposal. **Question:** How likely are you to agree to this new policy? (Please use the 0-100 slider to indicate the likelihood.)

Negative Framing Bias: In a financial audit, the business manager finds that student meal programs in your school district lost about $150,000 over the past 3 years. The school board is taking strong issue with these revenue losses. The board president has proposed a policy solution: Mandate cafeteria workers to serve cheaper meals to students whose families have outstanding meal debt. **3 of 9** school board members **disagree** with this policy proposal. **Question:** How likely are you to agree to this new policy? (Please use the 0-100 slider to indicate the likelihood.)

DECISION SCENARIO #3: BUDGET POLICY

Positive Framing Bias: The governor recently enacted a 12% cut to your school district budget over the next 4 years. You must maintain the integrity of your basic education curriculum. Survey feedback from internal and external stakeholders indicates **72% agree** that the music programs be eliminated. **Question:** As the first step toward budget reduction, how likely are you to recommend that your school district eliminate the music programs? (Please use the 0-100 slider to indicate the likelihood.)

Negative Framing Bias: The governor has recently enacted a 12% cut to your school district budget over the next 4 years. You must maintain the integrity of your basic education programs. Survey feedback from internal and external stakeholders indicates **28% disagree** that the music programs be eliminated. **Question:** As the first step toward budget reduction, how likely are you recommend that your school district eliminate the music programs? (Please use the 0-100 slider to indicate the likelihood.)

Consider-the-Opposite Debiasing Intervention for Attribute Framing Bias

The consider-the-opposite debiasing intervention consisted of explicitly challenging one's own decision. Prior to responding to each decision scenario question, intervention group participants were asked to explicitly state (by typing) two reasons why others might challenge it. Prior to viewing each attribute framing bias scenario, intervention group participants are provided with these instructions:

INSTRUCTIONS: Before indicating your answer, please provide two (2) reasons why others might challenge your decision.

EXAMPLE (Not included in this dissertation study):

Attribute Framing Bias Statement: **5 of 12** fellow school administrators **disagree** with this policy proposal.

Question: How likely are you to support this policy?

Tentative Decision: 40% likely to support the policy.

Reason #1 to Challenge: We could lose credibility among staff if we don't support this policy.

Reason #2 to Challenge: There could be political fallout if we don't support this policy.

Participant Demographic Data Collection:

1) What is your current position?

(Supt., Asst. Supt, Principal, Asst. Principal)

2) What is your education level?

(Bachelor's Degree, Some Master's Degree, Master's Degree, Some Doctoral Degree, Doctoral Degree)

3) How many years have you held the <u>current position</u> (round up to the next year)?

4) How many <u>total years</u> have you held any public education administration position (round up to the next year)?

5) What is your age?

6) How many students are in your school district (excluding private and charter schools)?

(Up to 1,000; 1,001-5,000; 5,001-15,000; 15,001-30,000; 30,001-75,000; 75,001 or more)

7) In what region type is your school district (primarily) located?

(Town / Borough, Rural, Suburban, Urban)

Appendix H: Participant Debriefing Statement (Quantitative Study)

This research study had two purposes. First, to evaluate the influence of cognitive bias on decision-making (control groups). Second, to evaluate the effectiveness of a debiasing strategy in mitigating cognitive bias (intervention groups). Cognitive bias is a phenomenon that can negatively influence decision-making, from everyday choices to consequential decisions. Cognitive bias is often observed in decision domains of personnel management and organizational policymaking. In this study, attribute framing bias and anchoring bias were the cognitive biases under experiment.

The control group read and responded to the decision scenarios. The intervention group completed debiasing tasks prior to responding to the decision scenarios. The debiasing strategy is called consider-the-opposite. The first set of decision scenarios was related to anchoring bias. The second set of decision scenarios was related to attribute framing bias.

To my knowledge, this study was only the second randomized-controlled experiment conducted on cognitive bias in public education administrator decision-making in the United States. Thank you again for your participation. My dissertation success depends on the willingness of administrators like you to participate.

I can be reached for questions or comments at the following email address. I am happy to share the study results directly to you upon completion of the dissertation. If you wish to receive the results, kindly email me and I'll be sure to include you.

Julie K. Mesaros

JM572052@wcupa.edu