AUDITOR JUDGMENT UNDER UNCERTAINTY

BY

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DISSERTATION

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Abstract

In this dissertation, I investigate how experienced auditors recognize and respond to the degree of management's evidentiary support and the level of estimate uncertainty when assessing management estimates. Drawing on information processing research, I predict that auditors can be more comfortable with management estimates, and expect a lower adjustment when there is alignment between the degree of estimate uncertainty and management's evidentiary support (i.e. high uncertainty and more support or lower uncertainty and less support). I test my prediction using an experiment where experienced auditors evaluate an uncertain warranty estimate. I manipulate the level of uncertainty by varying the range of potential costs as either two-times or eight-times materiality, and I manipulate the degree of management's evidentiary support by management either obtaining industry information, inquiring of technicians, or doing these two plus reviewing records, and performing field inspections. Results support my prediction; in the higher uncertainty condition auditors were more comfortable and expected a lower adjustment when management obtained more evidential support, but in the lower uncertainty condition auditors were more comfortable and expected a lower adjustment when management obtained less evidential support. Notably I find that alignment between estimate uncertainty and management's evidentiary support can make auditors more comfortable with management estimates supported by relatively *less* evidence. These findings demonstrate how audit risk factors, such as the level of uncertainty and degree of management's support can interact and cause auditors to more readily accept less supported financial statement estimates. More broadly, these findings reveal how providing more information can actually make recipients more uncomfortable with a proposition.

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1. Introduction

In this dissertation, I investigate how experienced auditors recognize and respond to the degree of management's evidentiary support and the level of estimate uncertainty. Estimates are an integral part of financial statements (Peecher, Solomon, and Trotman 2013) and pose a challenge to auditors (Griffith, Hammersley, and Kadous 2013). When auditing estimates, auditors often must rely on management's subject matter expertise and other private information, which guides management's selection of evidential support. Auditing standards require that auditors critically examine management assumptions and ensure that management estimates are sufficiently supported. The presumption in audit standards is that auditors will be more comfortable with better-supported management estimates. Drawing on information processing research, I predict and find that auditors can be more comfortable with management estimates with less support because comfort is driven by alignment between the degree of estimate uncertainty and management's evidentiary support (i.e. high uncertainty and more support or lower uncertainty and less support). That is, alignment between estimate uncertainty and management's support can occur when relatively less evidence supports some management estimates. My findings extend theory on judgments under uncertainty and auditor judgment by demonstrating how audit risk factors interact to influence auditor comfort with management estimates, and the expected audit adjustment. I also contribute to the auditor skepticism literature by demonstrating how subtle factors that are under the control of management can influence auditors' expected adjustment to management estimates, and by showing the importance of skepticism of management's selection of evidentiary support.

Prior research has revealed that auditors sometimes are not sufficiently critical and use motivated reasoning in deciding whether to accept management accounting treatments (cf. Hackenbrack and Nelson 1996; Salterio and Koonce 1997; Kadous, Kennedy and Peecher 2003; Ng and Tan 2003). I examine a related but different phenomenon whereby alignment of risk factors undermines auditor tendency to systematically, versus heuristically, evaluate management's accounting choices. Importantly, I conjecture that alignment between estimate uncertainty and evidential support promotes auditor comfort, while misalignment diminishes auditor comfort, causing them to more critically evaluate the sufficiency of management's evidential support.[1]

This dissertation uses the Heuristic-Systematic Model (HSM) of information processing to support its predictions. The HSM proposes that people use two fundamental modes of information processing, the systematic and the heuristic (Chaiken 1980; Zuckerman and Chaiken 1998). The systematic processing mode is analytical and involves relatively high levels of data seeking, analysis, and integration. The heuristic processing mode involves simplified decision rules that use less information, and more intuitive, automatic processing based on learned knowledge structures. Importantly, individuals default to using heuristic processing unless motivated to use more effortful systematic processing.

In this dissertation, I investigate how estimate uncertainty and the degree of management's evidentiary support endogenously motivate the auditor to process management's assumptions systematically as opposed to heuristically. Within my context, I predict that misalignment between the amount of uncertainty and the degree of

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[1] As discussed more fully in Chapter 2, auditor comfort can be thought of as auditor perception of the assurance provided over the financial statements.

management's evidentiary support increases systematic processing, giving the auditor less comfort until they have performed sufficient appropriate audit procedures. Alternatively, alignment between the amount of uncertainty and the degree of management's evidentiary support provides no disconnect and gives the auditor more comfort earlier in the audit process, before the performance of substantial audit procedures. Thus, I hypothesize that auditors are intrinsically less comfortable with extremely uncertain estimates when management has obtained little support, but also more comfortable with moderately uncertain estimates when management has obtained less support.

Using an experiment with experienced auditors, I examine auditor judgments early in the assessment of an uncertain warranty estimate. Early audit judgments can affect subsequent evidence acquisition and evaluation; and in turn, auditors' ultimate conclusions about the absence or presence of material misstatements and corresponding audit opinion. I manipulate estimate uncertainty by adjusting the range of potential losses as either $2.5 million (approximately two-times materiality) or $10.5 million (approximately eight-times materiality).[2] I manipulate the degree of management's evidential support as management basing their estimate on either industry information, inquiry of technicians, review of records, and field inspections; or only industry information, and inquiry of technicians. I measure the joint implications of these two factors on auditor comfort with management's estimate and the effect on their expected adjustment. After reading about a hypothetical company's need for an adjustment to its warranty accrual, as is common in the industry,

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[2] My operationalization of estimate uncertainty as the width of the estimate range is similar to Du and Budescu (2005), who varied the width of the range to manipulate "vague outcomes". As discussed more in Chapter 2, the uncertainty of an estimate with an undefined probability distribution is increasing in the width of the range of potential outcomes. I leave the probability distribution undefined because generally accepted accounting principles dictate the estimate once the probability distribution is known (as either the low end, or the most likely point within the range).

participants receive industry information that reveals an estimate range (*Moderate* or *Extreme*). They then receive management's analysis, which comprises the degree of evidential support (*More* or *Less*) and management's final warranty estimate (held constant across conditions). Participants then evaluate the reasonableness of, and comfort with, management's estimate; provide their expected financial statement adjustment; and respond to other related questions.

Results are consistent with my predictions. The degree of management's evidentiary support has an opposite directional impact on auditor comfort under relatively moderate versus extreme uncertainty. I find that under moderate uncertainty, auditors are *more* comfortable with management's estimate when management provided *less* supporting evidence. However, under extreme uncertainty auditors, more conventionally, are more comfortable with management's estimate when management provides more supporting evidence. I also find that auditor comfort mediates their expected adjustment to the financial statements, providing a link between auditor comfort and the financial statement estimate. In supplemental analysis I find a similar interaction effect between estimate uncertainty and evidential support on auditor perception of the level of assurance provided to users of the financial statements. To support my theory that lack of auditor systematic reasoning is driving my results, and not other implications of misalignment, I examine participants' responses to several follow-up questions. Participant responses reveal that my predicted interaction is driven by the level of systematic information processing and not by perceptions of management competence or by management's evidentiary support indicating a different level of uncertainty than implied by the uncertainty manipulation.

This dissertation extends theory on auditor judgments under uncertainty by demonstrating that uncertainty aversion and the typical understanding of audit risk factors does not fully explain auditor judgments regarding management's estimate. With this better understanding of how auditors combine audit risks to make judgments regarding estimate uncertainty, future research can explore similar potential hazards to auditor judgments and mechanisms to mediate these hazards. For instance, misalignment may occur due to poor calibration of management regarding auditors desired level of evidence, or management could strategically control the level of support to manipulate auditor comfort and financial statement adjustments.

My dissertation both differs from and complements earlier research on auditor risk evaluation by showing how very subtle misalignment between auditor expectations and evidence can enhance auditor comfort. Earlier studies generally predict and find that increases in audit risk factors, such as management's incentives to misstate (Glover, Jiambalvo and Kennedy 2000), client integrity (Peecher 1996), or heightened engagement risk (Hackenbrack and Nelson 1996) decrease auditor comfort. Alternatively, my theory and findings demonstrate that auditor comfort is not strictly increasing with increases in management's evidentiary support. These findings reflect the subtleties of combining risk factors, such as the level of uncertainty and degree of management's evidential support, when auditing accounting estimates. I also extend Griffith et al. (2013), by examining factors that contribute to auditors' comfort with management estimates. Across my experimental conditions, for example, auditors' average levels of comfort leads them to classify identical management estimates as reasonable versus unreasonable. Understanding how auditors combine risk factors and naturally become comfortable with estimates,

depending on the alignment of evidential support and uncertainty, may help regulators who design standards intended to promote audit quality. Without such understanding, regulators are unlikely to contemplate that auditors may be more comfortable with less management evidential support for some estimates, or that their own critiques about auditor judgment quality could be motivated by the misalignment between uncertainty and the degree of audit evidence.

The remainder of this dissertation is organized as follows. In Chapter 2, I discuss related research and theory, and further develop my hypotheses. In Chapter 3, I summarize my experiment and participants. In Chapter 4, I present the results of my experiment along with supplemental analysis. Lastly, in Chapter 5, I conclude the dissertation and present areas for future research.

2. Literature Review and Theory Development

2.1 Auditing Estimates

Accounting estimates are an integral part of financial statements, and they give management the ability to provide private information to the market pertaining to future resolutions of current period uncertainties. Estimates with high or extreme uncertainty are frequently more subjective because they afford more discretion in the selection and interpretation of inputs. Thus, auditing the reasonableness of management estimates under extreme uncertainty is difficult and requires extensive professional judgment (Peecher, et al. 2013; Christensen, Glover and Wood 2012). Difficulty gathering and applying evidence for highly uncertain estimates inevitably causes differences in professional judgment (Bell and Griffin 2012), as revealed by publicly disclosed portions of PCAOB inspection reports (e.g. PCAOB 2008). Despite the importance of accounting estimates and the difficulty inherent in auditing them, we know relatively little about how auditors become comfortable with management estimates (Griffith et al. 2013).

Auditors are required to plan and perform an audit to gain comfort that the financial statements are free of material misstatement. Within the context of accounting estimates, auditor comfort consists of factors such as the reasonableness of management's estimate, verifiability of the estimate, and potential management bias.[3] Importantly, comfort captures the subjective nature of assessing the sufficiency and appropriateness of evidence used to support an estimate that is inherently uncertain. Auditor comfort pertaining to estimates is

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[3] As discussed more fully in the next section, I conceptualize the audit as a series of comfort producing activities that are summarized into overall comfort that the financial statement are not materially misstated, and then passed on to end users of the financial statements (Pentland 1993; Pomeroy 2013; Carrington and Catasús 2007). This notion is consistent with personal experience in audit practice, discussions with practicing auditors, review of firm specific materials, and audit procedures providing subjective support for the auditor to proceed and eventually issue an audit opinion, in contrast to audit procedures providing objective proof that the financials are not misstated.

unique from other financial statement items because there is inherent uncertainty (i.e. unknown outcome) in addition to audit uncertainty (i.e. detection risk) (cf. Bell and Griffin 2012). Therefore, an estimate could be materially correct and also be materially different from the final (unknown) settlement amount. Auditors are responsible for determining the reasonableness of management estimates given the evidence available at the time the estimate is made, which can increase the influence management's evidential support has on auditor judgments.

Auditing accounting estimates involves some combination of (1) evaluating management's process to develop the estimate; (2) developing an independent expectation to corroborate management's estimate; and (3) reviewing subsequent events (PCAOB 2010a). The auditor performs these procedures to arrive at a range of reasonable values to help judge the reasonableness of management's estimate. Auditors are required to opine on the reasonableness of management estimates, despite the underlying verifiability or uncertainty of the estimate (Martin, Rich and Wilks 2006). An extensive body of research has examined auditor judgment pertaining to estimates; however, much of this research utilizes the subjectivity of estimates to study the effects of auditor incentives, prior beliefs, or judgment errors, as opposed to looking at the impact of the estimate itself (Griffith et al. 2013).

Environmental factors and practical limitations often restrict the degree of evidential support available to auditors, making it difficult, in some circumstances, to determine what constitutes sufficient appropriate evidence. The conventional presumption in auditing standards and most audit research is that greater evidentiary support reduces uncertainty and thus auditor reasonableness assessments should increase when greater evidence is available to support the estimate (c.f. Budescu, Peecher and Solomon 2012; PCAOB 2010b; Elder and

Allen 2003; Mock and Wright 1993; and 1999). However, the determination of what constitutes sufficient, appropriate evidence when auditing an uncertain estimate is subjective, and likely influenced by various contextual features. Gathering sufficient, appropriate evidence is a growing issue in auditing, due in part to the increased use of fair values (Bell and Griffin 2012; Christensen et al. 2012; Bratten et al. 2012). Christensen et al. (2012), for example, discuss a sensitivity analysis provided in Wells Fargo's 2008 financial statements and illustrate that a 200 basis point range (not unreasonable in that environment) would yield an adjustment to the financial statements fifty four times materiality, and it would only take a 3.7 basis point change to reach materiality. Auditors face the challenge of determining what constitutes sufficient appropriate evidence in light of such extreme uncertainty.

According to auditing standards, the risk of misstatement of an estimate is a combination of the "complexity and subjectivity associated with the process, the availability and reliability of relevant data, the number and significance of assumptions that are made, and the degree of uncertainty associated with the assumptions." (AU Section 342.05, *Auditing Accounting Estimates* (AICPA 1988)). Thus, in the early phases of the audit, auditor comfort should reflect these factors. However, auditing standards seem to imply that these risk factors are additive and do not interact with each other in any meaningful way. Alternatively, I predict that some of these factors interact with each other to influence overall auditor comfort with management estimate. Principally, I predict and find that the degree of uncertainty and level of management support (significant management assumption regarding the availability and reliability of relevant data) interact to make auditors more comfortable when management has less support.

2.2 Auditor Comfort

Comfort, used as my primary variable of interest, reflects the inherent uncertainty within auditing and the terminology of practicing auditors (Pentland 1993; Carrington and Catasús 2007). The term, auditor comfort, was highlighted at least as early as Pentland (1993), who discusses auditing tasks as rituals providing comfort to the auditor who then provides comfort to financial statement users. In a later study, Carrington and Catasús (2007) discuss comfort from three dimensions, comfort as a state, comfort as relief, and comfort as renewal. The main thrust of this literature, and the use of the term comfort, is to emphasize the subjective nature of providing assurance, most notably the notion that assurance is not merely an objective evaluation of evidence but a ritual that produces comfort. Comfort captures the subjectivity of providing an opinion on financial statements that contain inherently uncertain estimates, based on partial examination of the underlying support. Put another way, comfort reflects quality, not just acceptability of financial statement amounts. Comfort highlights the fact that audits are not purely statistical exercises that produce objective proof, but a series of activities that provide a subjective belief that the financial statements are reliable.

Although comfort as a measure of auditors' willingness to accept management assumptions is new to experimental researchers, prior research has documented auditor use of the term in practice to refer to extent to which a risk of misstatement is acceptable (Pentland 1993; Carrington and Catasús 2007; Hurtt 2010). Comfort has been used to describe the extent to which auditors are willing to accept management assertions in audit firm releases (PWC 2012; Ernst & Young 2006; KPMG 2011; Bell et al. 2005), and in academic research (Biggs et al. 1988; Martin et al. 2006; Pomeroy 2013). For example,

KPMG (2011, 10) states that a question one might ask when trying to identify objectives is, "are you comfortable at a 'gut level' moving ahead with the judgment process?" The term comfort also arises in practice relating to auditor letters for underwriters that provide varying levels of assurance over financial statements and other firm data for interim periods (AU Section 634, *Letters for Underwriters and Certain Other Requesting Parties* (AICPA 1998), and which are referred to in practice as "Comfort Letters" (Resnick 1979). Even outside of accounting, researchers routinely use the term comfort to describe the extent to which a risk is acceptable to an individual (Tetlock and Boettger 1994; Chow and Sarin 2002, Dowling Staelin 1994; Gurmankin et al. 2004).

Comfort captures the notion that auditor assurance over financial statements extends beyond just the acceptability of management's accounting. Auditing standards on estimates generally limit auditor responsibility to assessing reasonableness; however, standards on required auditor communications to the audit committee highlight the notion that assurance is more than just reasonableness. Standards require auditors to communicate to the audit committee not just the appropriateness of management estimates but also the quality of those estimates (PCAOB 2012). Although the PCAOB focuses its discussion of quality on potential management bias, earlier auditing standards (AU Section 380, *The Auditor's Communication With Those Charged With Governance* (AICPA 2006)) highlight potential quality factors as those that may influence representational faithfulness, verifiability, and neutrality. Similarly, the Blue Ribbon Committee (1999), in its recommendation that auditors discuss the quality of a company's accounting highlighted quality factors such as clarity of financial disclosures and aggressiveness. Notably, earlier standards recognized that "Objective criteria have not been developed to aid in the consistent evaluation of the

quality of an entity's accounting principles as applied to its financial statements" (AU Section 380.11 (AICPA 2006)). Thus, audit standards have long recognized that providing assurance extends beyond simply assessing the appropriateness or reasonableness of an estimate to more subjective evaluations of quality. Auditor comfort captures estimate reasonableness and more subjective factors inherent in providing assurance. Studying comfort will help auditors, regulators, and researchers understand some of the factors contributing to the level of assurance, for which objective criteria do not exist.

I use auditor comfort to examine key interactions of inputs into the judgment process (i.e. uncertainty and management support) because it capture the subjectivity of the audit process and is a primary measure used by auditors in practice to make many audit judgments (Pentland 1993). Prior research examining auditor judgment under uncertainty frequently focuses on outcome measures such as whether to require disclosure (e.g. Nelson and Kinney 1997; Hackenbrack and Nelson 1996; Jenkins and Haynes 2003), or the likelihood and amount of an adjustment (e.g. Haynes et al. 1998; Griffin 2011; Braun 2001; Libby and Kinney 2000; Nelson et al. 2005). By focusing on the comfort, as opposed to outcome measures alone, I am better able to differentiate the cognitive driver of the audit outcome, which helps to understand auditor judgment processes. My approach is similar to some other studies that focus on auditor judgment processes, and use measures encompassed by comfort (e.g. Kadous et al. (2003) use acceptability, and Earley (2002) uses reasonableness). As discussed earlier, comfort captures both the acceptability and reasonableness of management's estimate as well as more subjective factors that are less understood. By examining the interactive affects of estimate uncertainty and management support on auditor

comfort, I capture a key auditor judgment that can affect many areas of the audit, including the expected adjustment (which I also measure).

Overall, auditor comfort is a robust construct used extensively in practice to represent the level of assurance that auditors believe they are providing over the financial statements. Thus, comfort is a useful measure of auditor judgments in this context, because it captures the subjective nature of auditor evidence evaluation in a manner familiar to the auditor while providing a meaningful measure of their cognitive process.

2.3 Auditor Skepticism

I examine how the interaction between estimate uncertainty and management evidentiary support interact to increase auditor comfort. Importantly, I conjecture that auditors will be more comfortable unless misalignment between estimate uncertainty and evidential support motivates auditors to process information more systematically. Auditor comfort is also related to auditor skepticism. Auditor comfort with management's estimate reflects the extent to which they suspend judgment on management's assertion; suspension of judgment is a key dimension of auditor skepticism (Hurtt 2010). Additionally, increased comfort decreases the likelihood that auditors will reach judgments and decisions that "reflect a heightened assessment of the risk that an assertion is incorrect" (Nelson 2009, p. 4). Furthermore, my theoretical prediction and finding that auditors are naturally more comfortable with less evidentiary support under moderate uncertainty would generally be considered to run counter to various perspectives in the literature on auditor professional skepticism, whether it is neutral, presumptive doubt, or Bayesian diagnosticity (Bamber, Ramsay and Tubbs 1997; Nelson 2009; Hurtt 2010). This dissertation contributes to the literature on auditor skepticism by illustrating how alignment of uncertainty and

management support increases auditor comfort and decreases skepticism, earlier in the audit process.

2.4 Uncertainty Aversion

Research in psychology, economics, and accounting demonstrates that individuals have a strong aversion to uncertainty, which is broadly defined as a recognized lack of knowledge (Kahneman and Tversky 1979; Frisch and Baron 1988; Keren and Gerritsen 1999; Morrison 2002).[4] Within the area of accounting and auditing, Nelson et al. (2005) demonstrate that auditors are averse to uncertainty by showing that they are more likely to require adjustment of a misstatement presented as a range than a misstatement presented as a point. Additionally, auditors are more conservative under higher risk and uncertainty (Kinney and Martin 1994; Hirst 1994; Barron, Pratt and Stice 2001; Smith and Kida 1991), and uncertainty has been shown to increase auditors' risk assessments leading to increased sampling rates (Zimbelman and Waller 1999; Taylor 2000).

Griffin (2011) evaluates the precision and subjectivity of fair value estimates on auditor judgments and finds that auditors are more inclined to require adjustments when fair values are imprecise and subjective, an effect that is moderated when management chooses to disclose the uncertainty in the financial statements. Other studies in accounting have demonstrated that uncertainty decreases audit committee support for auditor adjustments (DeZoort, Hermanson and Houston 2003) and worsens earnings quality (based on a review

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[4] I am principally concerned with outcome uncertainty and do not test or discuss uncertainty about the shape of the underlying probability distribution (frequently referred to as probability uncertainty, vagueness, imprecision or ambiguity (c.f. Kuhn and Budescu 1996)). While probability uncertainty is frequently encountered in auditing (Nelson and Kinney 1997; Zimbelman and Waller 1999), I do not actively manipulate probability uncertainty as that would dictate the appropriate accounting treatment under FASB Interpretation No. 14, *Reasonable Estimation of the Amount of a Loss an interpretation of FASB Statement No. 5* (FIN 14) (FASB 1976). Additionally, prior research has indicated that individuals are more concerned with outcome uncertainty than probability uncertainty (Du and Budescu 2005).

of archival studies on earnings quality) (Francis, Olsson and Schipper 2006). I therefore anticipate that auditors in my experiment will be more comfortable with less uncertain estimates than with more uncertain estimates (i.e. a main effect of uncertainty).

I contribute to the uncertainty aversion research by predicting that uncertainty aversion alone does not explain auditor judgments related to estimates well. Instead, auditors' reasoning process about uncertainty surrounding estimates is regulated by natural triggers or suppressors that mediate their comfort.

2.5 Natural Triggers and Suppressors of Auditor Comfort

The Heuristic-Systematic Model (HSM) of information processing is a dual-process model that distinguishes between judgments made systematically and those made heuristically.[5] Heuristic processing requires less effort and involves using learned knowledge structures regarding cues instead of detailed evaluation of individual aspects of information. Heuristic processing is considered the default individual preference for making decisions and only requires that a heuristic is available, accessible and applicable (Chen, Duckworth and Chaiken 1999; Higgins 1996). Broadly defined, systematic processing involves more complex, effortful thinking regarding data seeking, analysis, and integration of information. In order to engage in systematic processing one must have the cognitive ability and motivation to do so. The motivation to perform systematic processing (as opposed to heuristic processing) is driven by the difference between an individual's actual level of comfort and their desired level of comfort; the greater the difference the greater the motivation to perform systematic processing (Chen et al. 1999). The HSM is particularly

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[5] The Elaboration Likelihood Model (ELM) (Petty and Cacioppo 1986) proposes similar modes and would generally yield similar predictions. I use the HSM to theoretically support my predictions because its concept of heuristics is a bit broader than ELM's 'peripheral cues' and simplifies my exposition.

relevant to the auditing setting where auditors are required to gather sufficient, appropriate evidence to reach a desired level of comfort regarding the accuracy of the financial statements.

Prior research and regulatory inspections suggest that auditors frequently over-rely on management assertions, and are not sufficiently skeptical. PCAOB inspection reports claim that auditors sometimes fail to adequately question management assumptions (PCAOB 2011a; PCAOB 2011b; PCAOB 2008). Further, recent research (Griffith et al. 2013) documents that auditors rely heavily on management's estimate-generating process rather than independently developing expectations. Past research has documented instances where auditors are more inclined to support management's accounting when standards are unclear (Hackenbrack and Nelson 1996; Salterio and Koonce 1997; Kadous et al. 2003; Ng and Tan 2003), or the auditor has a weaker understanding of the environment (Brewster 2009).

Given prior research on auditor judgment, I contend that auditors are often not inclined to systematically evaluate management's assumptions but instead are inclined to accept and be relatively comfortable with management's accounting, unless some trigger causes them to question management's assumptions. Absence of a trigger leads to heuristic processing, which subtly affects the mindset of the auditor, making them less critical with regard to the procedures performed and evidence evaluated. Heuristic processing will reduce auditor vigilance in assessing the reasonableness of management's estimates, and will make them apt to think that the most appropriate amount to record in the financial statements is relatively close to management's preferred amount. Therefore, I contend that auditors do not systematically process information unless triggers exist that motivate them to do so. In

the auditing context, misalignment between the degree of management evidentiary support and uncertainty surrounding an estimate could provide the necessary trigger.

Literature in communication also has examined the implications of misalignment between the quantity of information provided and the quantity anticipated, and found that misalignment increased skepticism regarding the assertions presented. Grice developed norms or maxims of communication that help people understand each other, one of which was the quantity maxim (1975). The quantity maxim states that in communication one should provide only that information which is required; too little information leads to ambiguity and excess information causes confusion as the recipient tries to interpret it in light of the situation. Both of these misalignment conditions increase the recipient's focus on the information and decrease their focus on the communication, leading to more systematic processing of the information. In line with this notion, prior research has found that overzealous communication by companies decreases legitimacy by increasing constituent skepticism (Ashforth and Gibbs 1990).

The forgoing discussion suggests the following role of alignment (see Figure 1). Figure 1, Panel A depicts a graphical representation of my context. The *x*-axis represents the level of uncertainty and the *y*-axis represents the degree of management's evidential support. The diagonal dotted line represents the auditor's expectation; as estimate uncertainty increases, the auditor expects higher degrees of evidential support. The upper solid line and lower dashed line represent more and less evidential support provided by management, respectively. Figure 1, Panel B depicts a graphical representation of my theoretical predictions. My theory predicts that points along the auditor's expectation line elicit less systematic processing than points not on the expectation line. The diamonds represent the

points where management's evidentiary support and auditor expectations for support, given the level of uncertainty, are aligned. The square represents misalignment by seemingly 'too much' evidential support given the level of estimate uncertainty; whereas, the circle represents misalignment by seemingly 'too little' evidential support. The arrows between the diamonds and the square or circle (depending on condition) represent the extent of misalignment, and thus the extent of auditor discomfort.

2.6 Hypotheses

Based on the HSM and Grice's communication norms, I predict that auditors will naturally be more comfortable with management estimates when there is alignment between the degree of management's evidentiary support and the level of estimate uncertainty. Specifically, I hypothesize that when management has less support for an extremely uncertain estimate, auditors are less comfortable. More troubling, however, when management has less support for a moderately uncertain estimate, I predict auditors to be more comfortable with management's estimate. This discussion leads to my formal hypotheses regarding auditor judgment.

> **H1:** Under moderate uncertainty, auditors are relatively more (less) comfortable with management's estimate when management provides less (more) evidential support; but under extreme uncertainty, auditors are relatively less (more) comfortable with management's estimate when management provides less (more) evidential support.

I further predict that auditor comfort will directly effect auditor's expectation of the most likely adjustment to management's financial statements. This prediction provides a link between auditor's skeptical judgments and their anticipated skeptical actions (cf. Nelson

2009; Shaub and Lawrence 1996). I predict that judgment will translate into action because the auditor can focus their questions on the estimate uncertainty; thus, the auditor can avoid the face-to-face confrontation of management that Shaub and Lawrence (1996) indicate causes a disconnect between skeptical judgment and action.[6] When auditors are more comfortable with management's estimate, they will anticipate a lower adjustment to the financial statements; however, when auditors are less comfortable with management's estimate they will anticipate a higher adjustment to the financial statements. Thus, I predict that auditor comfort will mediate auditor perception of the most likely adjustment to the financial statements. Formally stated:

H2: Auditors' comfort with management's estimate mediates their expected adjustment to the financial statements.

Taken together, I hypothesize that auditor evaluation of management's estimate will be influenced by the alignment between the level of uncertainty and the degree of management's evidentiary support. These hypotheses imply a disordinal interaction between uncertainty and support.

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[6] Nelson (2009) identifies factors that can influence the extent that skeptical judgment leads to skeptical action, including incentives, traits, knowledge, and audit experience and training. Ex-ante there is no reason to expect that any of these factors will inhibit auditor judgment translating into action in my context.

3. Method

I test my predictions using a 2x2 between-subjects, experimental design with experienced auditors. The experimental method provides sufficient control over the context to distinguish between the effect of the level of uncertainty and degree of management evidentiary support even though these factors may correlate in practice. An experiment also helps control for other environmental factors. I use experienced auditors for four specific reasons. First, one could argue that auditors are trained in the financial statement implications of audit risks and specifically trained to be critical of management assertions. Thus, findings from an experiment using non-auditor participants may not generalize to auditors. Secondly, my predictions rely on auditors using learned knowledge structures to recognize conditions of alignment and misalignment. Participants with little or no audit experience would not be able to recognize alignment and misalignment and thus my predictions would not manifest. Third, using a context where experienced auditors make familiar audit related judgments helps address the concern that familiarity (or leaning over time) would nullify my findings. Lastly, the term 'comfort' is everyday language to auditors and their job revolves around gaining comfort with uncertainty. Overall, an experiment with experienced auditors provides the necessary contextual control and participants to appropriately test my hypotheses.

I examine auditor judgments in the early (risk assessment) phase of an audit of an uncertain warranty estimate. I manipulate estimate uncertainty by varying the range of potential outcomes (*Extreme vs. Moderate*) and management's evidentiary support by varying the number of types of support utilized (*More vs. Less*). Participants are introduced to the company, read a brief background and update on the current year audit, and are made

aware of an industry wide issue that will affect the current year warranty accrual. Participants then receive more detailed industry information along with management's analysis and adjustment to the warranty accrual and assess the reasonableness of management's adjustment to the current year accrual.[7] See Appendix A for the experimental materials.

3.1 Participants

Audit seniors from a Big Four firm (n=95) completed the experimental task at a national training session for experienced senior associates, sponsored by the firm. Participants had mean (standard deviation) audit experience of 3.6 years (1.1 years) ranging from 2 to 8 years, and 2.6 years of public company audit experience. Participants took an average of 27 minutes to complete the task.

I exclude from my primary analyses data from seven auditors who failed to complete all necessary portions of the experiment, and one auditor who demonstrated inattentiveness to the experiment by responding with the same point on twenty consecutive scale questions.[8] After these exclusions, there were eighty-seven usable participant responses. Participants indicated they were familiar with the accounting for estimates (6.2 on an 11-point scale with

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[7] Statement of Financial Accounting Standards 5 (SFAS 5), *Accounting for Contingencies,* requires that a contingent liability be recorded only when a loss is both probable and reasonably estimable (FASB 1975). Based on discussions with practicing auditors, and personal experience as an audit manager, it is extremely unusual that a loss be probable and not presumed to also be reasonably estimable. This application of the standard leads to estimates for liabilities that are probable (or even certain) but where the amount is highly uncertain and minimally supported. Within the warranty loss situation that I examine, no auditor that I consulted with in preparation of the instrument indicated that the estimate was not estimable and that nothing should be recorded; however, three participants responded with either very low or no adjustment, which indicates that they believed the estimate was likely not reasonably estimable. These three participants are discussed more fully in the results section.

[8] To identify inattentive participants I performed a response pattern test by identifying the longest string of consecutive responses by each participant (Meade and Craig 2012; Johnson 2005). Based on the results of this test I dropped one inattentive participant who responded with the same point on the scale for twenty consecutive scale questions, the next longest string was five. Results for auditor comfort for all participants is reported in Table 4, and shows that my results are not sensitive to my participant selection criteria.

0 being not familiar and 10 being very familiar) and participated in discussions with management (6.8 on an 11-point scale with 0 being never and 10 being very often).

3.2 Experimental Task

The hypothetical company, Advanced Network Services (ANS) sells and installs computer network equipment and provides warranty and servicing under fixed rate contracts to its customers.[9] Last year the company began installing technologically advanced routers, and management recently discovered that many of the installations were faulty, causing higher than average warranty repair costs. Most companies in the industry also adopted the new routers and were having similar installation and warranty estimation issues. ANS gathers industry information to develop an initial range of costs and gathers internal evidence that further supports their estimate. In all cases, management estimates the same 'most appropriate' adjustment based on the midpoint of the inputs initially identified across the industry.

Independent Variables

I manipulate degree of management support and level of estimate uncertainty between subjects. In the *More* support condition, management bases their estimate on industry information, inquiry of installation technicians, review of installation records and field inspections. In the *Less* evidence condition, management bases their estimate only on industry information and inquiry of installation technicians.[10] I designed the task to provide a clean manipulation of management's evidentiary support for the estimate while ensuring that my moderate uncertainty/less support condition was considered aligned. I ensured

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[9] The experimental task is novel to this research project but was motivated by warranty reserve issues experienced by Microsoft on its XBox gaming console.

[10] Under SFAS 5, basing a warranty accrual on other companies in the same business is appropriate when the company has no experience of its own (FASB 1975).

alignment of this condition by discussing the manipulation with practicing auditors, recalling my own audit experience, using an estimate task where audit procedures are not dictated by standards or practice, and by having other companies in the industry rely primarily on inquiry of installation technicians.

I manipulate estimate uncertainty as the industry's range of potential costs associated with repairing the faulty installations (*Extreme or Moderate*). In the *Moderate* condition, the range of potential costs is $2.5 million (two times materiality) and in the *Extreme* condition, it is $10.5 million (eight times materiality).[11] In all conditions participants were informed that "... the necessary adjustment to the warranty accrual is almost certainly in excess of quantitative materiality of $1.3 million that was set during audit planning".[12] See Appendix A, Section 2 for the *Extreme* uncertainty and *Less* evidential support condition, and Section 3 for the *Moderate* uncertainty and *More* evidential support condition (the two misaligned conditions).

Dependent Variables

After reviewing this information, participants respond to a set of questions about the warranty issue and the audit (see Appendix A, Section 4). I ask two questions designed to capture the auditors' comfort with management's warranty accrual. The two questions are (1) "Rate the overall reasonableness of management's $7,507,500 adjustment to the warranty accrual?" (-5=Not at All Reasonable, 0=Just Meets Reasonableness Threshold,

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[11] I chose ranges for this dissertation to ensure that participants would not perceive the adjustment as insignificant, while providing a strong enough manipulation to give the theory the best chase of manifesting. The range as a multiple of materiality (two, and eight times materiality) is also consistent with the mean aggregate audit adjustments reported in earlier studies (Kinney and Martin 1994).

[12] In both of my uncertainty conditions the probability that the range is greater than materiality is very high. For instance in the moderate uncertainty condition; if participants perceive a normal distribution with the range as a ninety-five percent confidence interval there is a thirty-two percent chance the range is greater than materiality. Likewise, if participants perceive a uniform distribution within the range there is a fifty percent chance the range is greater than materiality.

5=Very Reasonable), and (2) "How comfortable are you with management's adjustment to the warranty accrual?"(-5=Very Uncomfortable, 0=As Comfortable As Not, 5=Very Comfortable). I also ask questions designed to measure the participants' perception of the evidence, management's analysis, and the level of assurance provided to users. In addition to these measures, I ask participants to determine their own best estimate, reasonable range of adjustments, and lastly the amount they "believe will most likely be recorded in the financial statements" (expected adjustment). My primary dependent variables are (1) a composite measure taking the average of the reasonableness of the adjustment and the auditor's comfort with the adjustment, and (2) the expected adjustment to the financial statements, on top of management's estimate. Following the dependent measures, participants respond to a series of process measures, complete a short within-subjects task, answer manipulation checks (Appendix A, Section 5), and complete demographic questions (Appendix A, Section 6). I discuss each variable collected in the experiment; and tabulate and discuss the results of each variable in Appendix B.

4. Results

4.1 Manipulation and Context Checks

The experimental context was designed such that participants would generally be less comfortable with lower adjustments to the warranty accrual (conservatism). My prediction in H2 relies on participants being less comfortable with lower adjustments and this relationship will not hold (or be reversed) if participants believe that management's adjustment is too high. Given the importance of participants not perceiving management's estimate as too high (too conservative), I exclude three participants who entered adjustment amounts far below management's estimate (i.e. participants that think management is *understating* income).[13] As reported in Table 4, Panel B, Column E, the inclusion of these observations strengthens my results for auditor comfort (H1) ($F(1,83) = 8.45$; $p_{one\text{-}tailed} < 0.01$). As one would expect, however, the mediating affect of auditor comfort on expected adjustment (H2) is no longer significant (Step 3 of Barron and Kenny (1986), $t(82) = -1.06$; $p_{two\text{-}tailed} = 0.29$), although the interaction effect on the expected adjustment (Step 1), remain marginally significant ($F(1,83) = -1.47$; $p_{one\text{-}tailed} = 0.07$).[14] The elimination of these participants results in a final sample size of eighty-four usable participants.

Participants were asked to identify the range of potential costs presented in the industry information and ninety-three percent answered consistent with their condition.

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[13] These participants responded to the context very differently than I planed and very differently than all other participants. Results that include a small set of influential outliers can cause either Type I or Type II errors by reporting results that reflect the outliers while appearing to reflect all the observations (Judd et al. 1995). A scatter plot of the residual terms against the predicted values and Cook's distance revealed that these three observations were outliers and very influential in analysis of the expected adjustment to the financial statements. These three observations have studentized residuals in excess of three, and Cook's distances more than three times that of the next most influential observation. The three outliers were all in the *Extreme* condition, with one in the *More* and two in the *Less* support conditions.

[14] Controlling for the outliers provides similar results to those reported (H1 ($F(1,86) = 8.00$; $p_{one\text{-}tailed} < 0.01$; H2 step 3 $t(86) = -2.33$; $p_{two\text{-}tailed} = 0.02$, step 4 $t(86) = -1.70$; $p_{two\text{-}tailed} = 0.09$), as does reverse coding outliers (H1 ($F(1,86) = 6.46$; $p_{one\text{-}tailed} < 0.01$; H2 step 3 $t(86) = -3.72$; $p_{two\text{-}tailed} < 0.01$, step 4 $t(86) = -0.63$; $p_{two\text{-}tailed} = 0.53$).

Participants were also asked which pieces of information were accumulated and analyzed by management and eighty percent answered consistent with their condition. The lower correct response rate in the management support conditions is partially due to the support in the *Less* condition being a subset of the support in the *More* condition, and participants only checking off the one piece of support that was present in all conditions (which was also the first option in the manipulation check question); adjusting for this increases the correct response rate to eighty-seven percent. Eliminating participants who failed at least one of the manipulation checks does not significantly affect my results. In addition to the direct question regarding support, I also asked participants "how much evidence is available to support the warranty accrual adjustment" (0=minimal evidence, 5=average evidence, 10=extensive evidence). Consistent with my manipulation, participants indicated that there was more support in the *More* condition (mean = 4.4) than the *Less* condition (mean = 3.0) ($F(1,80) = 13.91$; $p_{two\text{-}tailed}$ < 0.01).[15] These high rates indicate that both manipulations were successful.

In follow-up questions, I asked participants a series of questions related to the case and management. To ensure that participants evaluated the warranty adjustment as material, I asked participants how likely "is the warranty accrual adjustment decision material to ANS's financial statements?" Participants believed the adjustment was material (0=Not Very Likely, 5=As Likely As Not, 10=Very Likely; mean=8.2), and there was no significant difference in materiality evaluations between conditions (i.e. all $p_{two\text{-}tailed}$ ≥ 0.34). Although participants viewed the warranty accrual decision as equally material across conditions, participants in the *Extreme* uncertainty condition evaluated the risk of material misstatement

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[15] This holds for both levels of estimate uncertainty (moderate, $F(1,42) = 6.36$; $p_{two\text{-}tailed}$ = 0.02; extreme, $F(1,38) = 7.45$; $p_{two\text{-}tailed}$ = 0.01).

as significantly higher (mean = 8.1) than those in the *Moderate* uncertainty condition (mean = 7.5) ($F(1,82) = 3.22$; $p_{two-tailed} = 0.08$). This is consistent with prior literature and auditing standards indicating that uncertainty increases the risk of misstatement. I asked participants "... how would you rate the controller's technical accounting knowledge?" (0=Very Weak Knowledge, 5= Average Knowledge, 10=Very Strong Knowledge; mean=5.1); there was no significant difference in perceptions of management knowledge between conditions (i.e. all $p_{two-tailed}$ ≥ 0.17).[16] Thus, follow-up questions reveal that participants believed that the adjustment was material and my manipulations did not effect participants' perceptions of management competence.

4.2 Hypotheses Tests

Test of H1: Joint Influence of Estimate Uncertainty and Management's Evidential Support on Auditor Comfort with Management's estimate

H1 predicts that when outcome uncertainty is *Extreme*, auditors are more comfortable with an estimate with *More* evidential support. However, when uncertainty is *Moderate* auditors are more comfortable with an estimate with *Less* evidential support. Table 1 (Panel A) provides descriptive statistics (see Figure 2 for a graphical representation) for participants' comfort with management's warranty accrual adjustment. I present the ANOVA and planned simple main effects tests for auditor comfort in Panels B and C. Auditor comfort is a composite measure, taking the average of participant responses to two

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[16] Results reported in Table 1 are robust to controlling for participants' perceptions of the controller's knowledge.

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questions designed to capture their perception of management's warranty estimate ('comfort with' and 'overall reasonableness' of management's adjustment).[17]

ANOVA results (Table 1 Panel B) provide support for H1 with a significant interaction of *Uncertainty* and *Support* ($F(1,80) = 7.38$; $p_{one\text{-}tailed} < 0.01$). I present contrast tests in Table 1, Panel C, and these provide additional insight into the predicted interaction. Consistent with conventional wisdom, when there was *Extreme* uncertainty participants were significantly less comfortable with management's estimate when there was *Less* evidential support (mean = -1.37) than when there was *More* support (mean = -0.12) ($F(1,80) = 4.41$; $p_{one\text{-}tailed} = 0.02$). Additionally, participants in *Moderate* uncertainty condition were significantly more comfortable with *Less* evidential support (mean = 1.01) than *More* evidential support (mean = 0.03) ($F(1,80) = 3.13$; $p_{one\text{-}tailed} = 0.04$). Overall, these results support H1.

Test of H2: Mediating Role of Comfort on Expected Adjustment

H2 predicts that auditor comfort with management's estimate will mediate auditor's expected adjustment to management's financial statements. To test this hypothesis, I conduct a mediation analysis using Baron and Kenny's (1986) four-step process.[18] Results of this mediation provide support for my hypothesis (see Figure 3). Step one, I show a significant association between the interaction of uncertainty and support and the expected

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[17] Results reported in Table 1 are robust to using either of these two measures independently (see Appendix 2, Table B1) or combining them using a Principal Component Analysis (PCA). I additionally asked participants to indicate whether management's adjustment was either (1) Reasonable (2) Right on the border between reasonable and unreasonable, or (3) Not reasonable; ordinal logistic analysis supports H1 with a significant interaction ($z = 2.13$; $p_{one\text{-}tailed} = 0.02$); however results do not reveal a main effect of uncertainty ($z = 0.75$; $p_{one\text{-}tailed} = 0.23$) as found using the other reasonableness measures.

[18] I discuss my mediation in terms of p-values (Baron and Kenny 1986); however the sensitivity of p-values to sample size and the notion that mediation does not require a significant association between the independent variable and the dependent variable (step one) has lead some to recommend different methods for testing mediation (Kenny 2012). Thus, I also ran a Sobel test of the indirect effect, which further supports my hypothesis ($p_{one\text{-}tailed} = 0.04$; bootstrapped $p_{one\text{-}tailed} = 0.05$) (Sobel 1982; Shrout and Bolger 2002).

adjustment ($t(80) = -2.54$; $p_{one-tailed} = 0.01$). Additionally, in Table 2, Panel A I provide

descriptive statistics for participants' assessment of the expected adjustment to the financial

statements.[19] ANOVA results are presented in Table 2 Panel B and provide support for step

one, with a significant interaction of *Uncertainty* and *Support* ($F(1,80) = 6.45$; $p_{one-tailed} = $

0.01). Contrast tests in table 2, Panel C show results similar to those for auditor comfort. In

the *Extreme* uncertainty condition participant estimates were significantly higher when there

was *Less* evidential support (mean = 1,596) than when there was *More* support (mean = 772)

($F(1,80) = 4.96$; $p_{one-tailed} = 0.01$). Additionally, participant estimates in the *Moderate*

uncertainty condition were significantly higher when there was *More* evidential support

(mean = 860) than when there was *Less* evidential support (mean = 387) ($F(1,80) = 1.81$;

$p_{one-tailed} = 0.09$).

Step two, as reported in H1, I show a significant association between the interaction

of uncertainty and support and auditor comfort with management's estimate ($t(80) = 2.72$;

$p_{one-tailed} < 0.01$). Step three, I show a significant association between auditor comfort and

expected adjustment ($t(79) = -2.36$; $p_{one-tailed} = 0.01$). Step four, I show that controlling for

auditor comfort weakens the association between the interaction of uncertainty and support,

and expected adjustment ($t(79) = -1.81$; $p_{one-tailed} = 0.04$). Overall, these results support a

partial mediation and thus provide support for H2, that auditor comfort with management's

estimate mediates auditor expected adjustments.

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[19] Auditor responses to the expected audit adjustment question were adjusted for management's proposed estimate of $7,507,500, and thus indicate the auditor's expected adjustment on top of management's estimate.

4.3 Supplemental Analysis

Support for theory and examination of alternative explanations

My theory predicts that the extent of auditor systematic information processing is driving their level of comfort. In this section I provide support that systematic processing drives auditor comfort when the level of estimate uncertainty and degree of management's evidentiary support are misaligned, but not when they are aligned. I also rule out the alternative that the degree of management's evidentiary support changes the perceived level of uncertainty and thus changes auditor comfort.

To determine the extent of systematic information processing used by auditors to determine comfort I examine auditor perceptions of case information that one might expect to affect their level of comfort, if they use systematic information processing. Under systematic processing, one could expect auditor's level of comfort to reflect a combination of their perceptions of (1) the amount of support, (2) adequacy of support, (3) comfort with support, (4) appropriateness of management's analysis, (5) conservativeness of management's estimate, and (6) confidence in their assessment of risk.[20] I create a composite measure of systematic processing by summing auditor responses to questions measuring these six items.[21] As expected, increased systematic processing increases auditor comfort ($F(1,81) = 12.98$; $p_{one\text{-}tailed} < 0.01$). More importantly, in support of my theory,

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[20] Specific questions were (1) How much evidence is available to support the warranty accrual adjustment? (minimal evidence = 0, extensive evidence = 10), (2) How adequate is the available audit evidence on which you can base your opinion pertaining to the warranty accrual? (not very adequate = 0, very adequate = 10), (3) How comfortable are you with the amount of available audit evidence pertaining to the warranty accrual? (not very comfortable = 0, very comfortable = 10), (4) How appropriate was management's analysis of the warranty issue? (very inappropriate = 0, very appropriate = 10), (5) How would you characterize management's adjustment to the warranty accrual? (conservative = 0, aggressive=10), (6) How confident are you of your assessment of a material misstatement of the warranty accrual? (not very confident = 0, very confident = 10).
[21] I sum these six measures so that the information each question captures is given equal weight in the systematic processing; thus, I make as few assumptions about the weighting of the different aspects of information as possible.

systematic processing mediates auditor comfort when estimate uncertainty and management support are misaligned (Sobel mediation test: $p_{one\text{-}tailed} = 0.04$; bootstrapped $p_{one\text{-}tailed} = 0.02$), but not when they are aligned (Sobel mediation test: $p_{one\text{-}tailed} = 0.40$; bootstrapped $p_{one\text{-}tailed} = 0.41$).[22] This finding provides support that my predicted interaction is driven by the extent of auditor's systematic information processing and not by differences in their perceptions of management's evidentiary support or analysis.

Another alternative explanation is that auditor's interpret the degree of management's evidentiary support as an indicator of the level of uncertainty. I test this alternative by measuring auditors' perceptions of the uncertainty of the estimate and see if it varies with evidential support. Auditors provided the low and high end of a range of adjustments in response to the question "What range of adjustments to the warranty accrual would you accept as reasonable for management to record in the financial statements?" Participants in the *Extreme* condition reported a significantly wider range (mean = 4,032) than participants in the Moderate uncertainty condition (mean = 2002) ($F(1,80) = 22.75$; $p_{one\text{-}tailed} < 0.01$), but there were no main or simple effects of support (i.e. all $p_{one\text{-}tailed} \geq 0.24$). These results, together with those discussed above indicate that management's evidentiary support had no effect on auditor's perceived uncertainty, and provide further evidence that HSM and misalignment between level of uncertainty and degree of evidential support drives my interaction. This also demonstrates how subtle factors, unique to the audit setting, can have significant influence on auditor comfort.

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[22] Mediation results under Baron and Kenny's (1986) four-step method are consistent with the results of the Sobel test, with full mediation (step four $p_{two\text{-}tailed} = 0.321$) in the misalignment conditions and no mediation in the alignment conditions (step four $p_{two\text{-}tailed} = 0.037$).

Perceived assurance provided to users of the financial statements.

Recently, the PCAOB and researchers have proposed that auditors communicate the amount of assurance provided on different aspects of the financial statements (PCAOB 2010c; Christensen et al. 2012; Bell and Griffin 2012). Auditor evaluation of the level of assurance provided to users of the financial statements is very subjective, especially when dealing with highly uncertain estimates. Given the subjectivity of the level of assurance and no clear benchmark, I predict that auditors' assessed level of assurance will be largely similar to their assessed level of comfort with the estimate. As such, if auditors are more comfortable with an estimate, they will presume that they are providing higher assurance over that estimate to users of the financial statements.

I examine auditor responses to the question "What level of assurance are you able to provide over the warranty accrual to users of the financial statements?" (0=Low Assurance, 5=Reasonable Assurance, 10=Almost Absolute Assurance) and report the results in Table 3. I report descriptive statistics in Table 3, Panel A. The pattern of results is similar to those found for auditor comfort; principally, the level of assurance in the *Extreme* uncertainty condition is higher when there is *More* support (mean = 4.38) than when there is *Less* support (mean = 3.62); and the level of assurance in the *Moderate* uncertainty condition is higher when there is *Less* support (mean = 4.99) than when there is *More* support (mean = 4.42). An ANCOVA (Table 3, Panel B) provides support for this with a significant interaction of uncertainty and support ($F(1,77) = 2.57$; $p_{one-tailed} = 0.06$).[23] Therefore, further research into auditor assessments of the level of assurance provided over financial

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[23] I control for auditors preliminary evaluations of risk of material misstatement (RMM) because it has a significant effect on auditor perception of the level of assurance provided; including preliminary RMM also reduces my number of observations to 82. Without controlling for preliminary RMM, results are weaker but still marginally significant ($F(1,80) = 1.71$; $p_{one-tailed} = 0.10$).

statements may be warranted before implementation of expanded auditor disclosure of assurance.

Discussion of all experimental variables

In Appendix B I discuss and tabulate statistics on all variables collected as part of this dissertation. In Section 1, 2, and 3 I define each variable, discuss why I collected it, and discuss the results. In Appendix B, Table B1, B2 and B3, I tabulated statistics for every variable and provide means and ANOVA results. I discuss variables and present the results in three groups. In Section 1, I discuss results on my primary variables of interest (tabulated in Table B1) and other audit planning variables that may be impacted by auditor comfort (e.g. risk of material misstatement, and additional audit work). In Section 2, I discuss results on all variables I use to compose my measure of systematic processing (tabulated in Table B2). In Section 3 I present other variables measured in the experiment, including context checks and control variables (tabulated in Table B3). These results are disclosed to demonstrate the robustness of the findings reported in this paper but caution should be taken before drawing conclusions from the results.

4.4 Normative Judgments

I predict that alignment between the level of uncertainty and the degree of management's evidentiary support subtly enhances auditor systematic thinking, leading to less auditor comfort. Within my context, I posit that auditors are unaware of the influence of alignment and are not consciously processing more or less systematically. Most audit observers would presume that auditors should be more comfortable with management's estimate when it is *More* supported. Alternatively, my dissertation reveals a situation where auditors prefer a less supported management estimate, a finding that is difficult to reconcile

with audit regulations, auditor skepticism, or normative models of decision making.[24] There is a long history behind the notion that better judgments are made when all available information is incorporated (Bernoulli 1713, Keynes 1921, Carnap 1947). Audit regulations further support the notion that more support is better by indicating that more evidence should be gathered in response to significant risks (PCAOB 2010a). However, the claim that more information is better has recently come under criticism because incorporating more information may reduce predictive ability (c.f. Gigerenzer and Brighton 2009). In the moderate uncertainty condition, where auditors are more comfortable with a less supported estimate, it is difficult to perceive that the auditor judgments are the most appropriate. However, there are conditions under which these judgments may be considered appropriate, and I address some of these below.

There are several conditions under which the auditor may actually be acting normatively by being more comfortable with less supported estimates. First, the additional support items may not be diagnostic or may represent over-fitting, such that management's inclusion of them actually expands the parameter space without improved accuracy (c.f. Myung and Pitt 1997). For instance, in an expanded version of my context each type of evidentiary support could indicate a different appropriate estimate, such that the evidence could support any estimate. In this situation, additional support increases the parameter space, making it more difficult to falsify management's estimate. My research design largely mitigates the notion that the additional support items outweigh their value. In the Less support condition management establishes their estimate based on industry information

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[24] For the purpose of this discussion I assume that auditor information processing is a costless activity. If I instead assume that information processing is a costly activity, the benefit of systematic processing would have to be higher in the misalignment conditions than in the alignment conditions to offset the increased cost.

and inquiry of their technicians; whereas in the *More* support condition they also reviewed records and performed field inspections. Viewing management's support as audit evidence reveals that the evidence in the *Less* condition is inferior to the evidence in the More condition, per extent audit standards. Industry information is generally noisier than company specific information and thus is unlikely to be considered better evidence (Budescu et al. 2012). Regarding inquiry, the PCAOB indicates that inquiry alone is insufficient evidence on which to base an opinion (PCAOB 2010a). Thus, it is unlikely that auditors perceive the additional support items in the *More* condition as being detrimental to arriving at an appropriate conclusion.

Auditors in the *Less* evidence condition may believe that the universe of available support is so small that the estimate represents an unknowable uncertainty. Research has found that people have less aversion to unknowable uncertainty than to known uncertainty; thus, auditors may be more comfortable with less supported estimates because they represent an unknowable uncertainty (Chow and Sarin 2002). To the extent that participants believed that the universe of available support was small because they did not systematically evaluate the estimate, my theory and predictions hold. Alternatively, if the additional support items (or other conceivable support) were so unexpected that my manipulation caused participants to perceived a smaller universe of available support, then participant's higher level of comfort with less support may be reasonable. I designed the experiment, and asked follow-up questions to mitigate and address this concern. I designed the experiment using a warranty liability because gathering and evaluating audit evidence for a warranty liability is familiar to the participants in my study. I also intentionally included support items in the *More* condition that would be common in this type of setting. I tested my choice of

supporting items by asking participants at the end of the experiment "what else, if anything, could management do to obtain additional evidence?" and eighty percent of participants responded in both the *More* and the *Less* conditions. Of the participants that responded in the *Less* condition, forty-nine percent listed review of company information and twenty-three percent indicated physical inspection, as additional support management could gather.[25] Overall, the warranty estimate in my experiment is not likely considered an unknowable uncertainty that would change auditor aversion to the uncertainty posed by the estimate.

Overall, it is difficult to argue that auditors in my dissertation are acting normatively when there is alignment in the moderate uncertainty condition, because they are more comfortable with a less supported management estimate. Running an experiment with experienced auditors where they complete a realistic audit task limits my ability to control explicitly for participant perceptions of either the quality of the evidence, or the universe of available evidence. However, my 2x2 experimental design, interaction hypotheses, and results that show higher auditor comfortable with more support under extreme uncertainty, lends additional support to the notion that *More* support is valuable and that the uncertainty is not unknowable. Thus, research, audit standards and the design of the experiment all suggest that auditors are not acting in a manner that ensures the highest audit quality in the *Moderate* uncertainty condition, where I find that they are more comfortable with less supported management estimates.

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[25] Apart from inspecting a sample of installations and reviewing installation (or similar) records, common support items were; reviewing historical failure rates and repair costs related to the installation issue, reviewing customer complaints, performing a more detailed analysis by installation technician or installation team, and involving an industry expert.

5. Conclusion

5.1 Discussion

In this dissertation, I predict that misalignment between the degree of management's evidentiary support and level of estimate uncertainty decreases auditor comfort and increases auditor expected financial statement adjustment. As predicted, when uncertainty is moderate, auditors perceive management estimates that are less supported as relatively more reasonable; however, under extreme uncertainty, I find that auditors perceive less supported estimates as less reasonable. I also find that auditor's response to alignment between the degree of management's evidentiary support and estimate uncertainty pervades other judgments, such as the expected adjustment to the financial statements and perception of the level of assurance provided to users of the financial statements. My results reveal that auditor reliance on management affects their judgments of what constitutes sufficient appropriate audit evidence; however, subtle factors can prompt heightened auditor skepticism.

This dissertation also informs recent proposals that recommend that auditors indicate sliding degrees of assurance depending on such factors as the uncertainty and auditability of management estimates (PCAOB 2010c; Christensen et al. 2012; Bell and Griffin 2012). Underlying such a change is the assumption that auditor assessments of assurance are representative of the underlying assurance provided. My theory and findings indicate that auditor comfort and assessments of assurance provided to users of the financial statements can be inconsistent with the general understanding that more evidential support equates to higher assurance. These findings reveal one limitation of auditors revealing their perception

of the assurance provided over management estimates and highlight the need for additional research prior to implementing new standards.

Overall, my theory-consistent, but potentially troubling finding that auditors can be more comfortable with management estimates supported by less evidence demonstrates an important implication of auditors' inadvertent failure to critically evaluate management's selection of supporting evidence. However, I also find that auditors are able to notice subtle factors such as misalignment between the degree of management's evidentiary support and estimate uncertainty, which prompt heightened skepticism. My theory and findings may be of help to regulators as they seek to ensure sufficient auditor skepticism and to researchers as they examine the implications of estimate uncertainty on auditor judgments.

This dissertation was conducted using experienced auditor participants in an audit context; however, the findings will likely generalize to other contexts. Most obviously, my findings would generalize to other evaluation and assurance contexts such as regulatory or insurance reviews. More broadly, my results reveal the importance of distinguishing between an individual's evaluation of the situation and their actions going forward. In my context, I find that auditor evaluation of management and the estimate reflect general uncertainty aversion and more information is preferred, as illustrated by my measure of systematic reasoning. However, auditor judgments deviate from most predictions of judgment under uncertainty for auditor actions going forward, as demonstrated by their level of comfort and expected adjustment. Thus, despite recognizing the level of uncertainty and the degree of management's evidentiary support the auditor can be more comfortable with regard to their future actions. Past studies have frequently used confidence as the dependent variable to measure the affect of uncertainty on individual judgments (e.g. Budescu et al.

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2003); however, in my context even auditor confidence in their judgment of the risk of misstatement does not capture their level of comfort. Overall, this dissertation reveals the important distinction between evaluating the uncertainty of a situation and being comfortable proceeding despite this uncertainty, a finding that can be applied in many different contexts.

5.2 Limitations and Future Research

The findings in this dissertation are subject to several limitations that present opportunities for future research examining auditor judgments under uncertainty. I test my predictions using a single interaction between the auditor and management. Thus, this study does not provide opportunity for auditors to interact with managers. Auditor interaction with management could strengthen my results if managers are able to exploit reduced auditor systematic processing, for example, holding back evidentiary support to increase auditor comfort. Alternatively, auditors may not be influenced by alignment under conditions of consistent interaction with management where they are able to learn about that specific management. To help mitigate this concern I used experienced auditors in a familiar context; however, future research could examine auditor judgments in a repeated interaction context and test the extent to which auditor judgments may change over time. Lastly, I examine audit judgments at the planning stage to capture auditor initial impressions that can influence all future aspects of the audit. Future research could examine the extent to which these judgments impact later aspects of the audit or investigate methods to mitigate the affect of alignment.

Future research could further investigate the impact of the level of uncertainty on auditor judgments. My finding that auditors can be more comfortable with uncertain

estimates supported by less evidence suggests that they potentially become acclimatized to moderate risk. This finding is consistent with prior research that suggests that professional skepticism decreases with auditor experience (Payne and Ramsay 2005). Could such acclimatization essentially change auditor perceptions of extreme uncertainty to the point where it is viewed as if it were moderate, seemingly warranting decreased attention? Further investigation of these and related questions provide promising opportunities for future research.

Appendix A
Experimental Instrument

1. Company Background

Advanced Network Services

Background

It is February 2012 and you are auditing the December 31, 2011 financial-statements of Advanced Network Services (ANS), a publicly traded professional services company with approximately $85 million in annual revenue.

ANS focuses on providing network installation, maintenance and equipment leasing services to businesses across the U.S. ANS prides itself in providing outstanding customer service through network design, installation, and long-term maintenance agreements.

ANS's revenue has increased 25% over the past two years due to acquisitions and organic growth in network upgrades and maintenance revenue. However, recent economic conditions have pushed prices down and net income has remained relatively flat despite top-line growth in sales volume. The company has been under increased pressure from investors to convert sales growth into earnings growth this year, through increased operating margins and lower expenses.

ANS is a large client for your office, with significant billable hours and audit fees. Your audit team has been working on the ANS audit for the past three years and you feel that your team has a strong working relationship with both the audit committee and ANS management. Your impression is that management is competent and cooperative in handling audit issues.

Recent Development

In response to the growth of high bandwidth Internet-based audio and video content, ANS began using a technologically advanced router (the R3a) in all new installations and upgrades last year. The R3a router provides speeds 10 times faster than the next fastest competitor, and has been widely adopted in the industry.

Warranty Accrual
Background

ANS provides a two-year warranty on all network installations and routinely provides warranty services after the two-year warranty period to maintain its high level of customer satisfaction.

ANS estimates warranty costs based on historical and projected failure rates, historical and projected repair costs and knowledge of specific product failures. Each quarter, ANS reevaluates its estimate to assess the adequacy of its warranty liability, and adjusts the amount as necessary.

As with similar companies, determining future warranty costs is an important accounting estimate and a critical audit issue, requiring considerable audit attention. In the audit team's judgment, the warranty accrual has been appropriate ever since your firm began auditing ANS, three years ago.

Warranty Accrual
Recent Development

Management Communication
In early December 2011, ANS's controller informed the audit team that a significant number of R3a routers were installed incorrectly, resulting in an unexpected increase in warranty costs. At that time ANS was working to assess the extent of the problem and financial statement impact.

ANS intends to repair all incorrect installations of the R3a to ensure minimal downtime for their customers. Repairs are scheduled to begin the end of February 2012.

Industry Publication
In late December 2011, an industry publication reported the results of a survey of 50 corporate IT managers. The survey reported that 75% of all R3a router installations are not in accordance with manufacturer guidelines.

The publication indicated that correct R3a router installation differs slightly from the installation of other popular routers and that this difference was the source of most of the problems. Incorrect installation results in inconsistent speed and higher than anticipated failure rates.

Risk of Material Misstatement
Based on a review of warranty costs through November 2011, the necessary adjustment to the warranty accrual is almost certainly in excess of quantitative materiality of $1.3 million that was set during audit planning.

Please respond to the following question by placing a vertical slash (|) on the scale.

For planning the year-end test work, how would you assess the risk of material misstatement of the Warranty Accrual?

```
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
0     1     2     3     4     5     6     7     8     9    10
Low             Somewhat          Average         Somewhat         Very High
Risk          Below Average        Risk         Above Average        Risk
```

<div align="center">**Warranty Accrual**
Update</div>

It is now mid-February 2012, and ANS has prepared the unaudited December 31, 2011 financial statements (pending final warranty accrual).

Based on test work completed so far, your team has not identified any material audit adjustments or significant deficiencies in internal control, including internal controls related to the warranty accrual.

The ratio of warranty costs to installation revenue increased in 2011 to 7.7%, from about 4% observed in previous years. ANS linked the increase in warranty repairs to incorrect installations of the R3a router, and has been working diligently to assess the magnitude of the problem.

Past warranty costs and warranty accrual, before considering pending adjustment for the R3a installation issue, are as follows:

	2009	2010	2011
Warranty Costs			
Actual warranty costs	$ 2,850,000	$ 2,980,000	$ 6,550,000
As a percent of revenue under warranty	4.2%	3.9%	7.7%
Warranty Accrual			
Installation revenue under warranty	$ 67,200,000	$ 76,850,000	$ 84,800,000
Projected repair rate*	4.0%	4.0%	4.0%
Warranty Accrual	$ 2,688,000	$ 3,074,000	$ 3,392,000

* Projected repair rate has not been updated to incorporate the R3a installation issue.

2. Extreme Uncertainty and Less Evidential Support Condition

Industry Inquiry

ANS's controller inquired of similar companies to determine what they were accruing for the R3a installation issue. The controller summarized the results of those inquiries below and shared them with your audit team.

- The range of incorrect installations is quite wide, from a low of 25% to a high of 85%.

- Estimated repair costs for each incorrect installation are between $550 and $750.

Other companies estimated the number of incorrect installations and the cost of repair based on inquiries of their installation technicians.

ANS Evidence

ANS has been performing inquiries of its own installation technicians and plans to provide your audit team that information as soon as it is completed.

ANS's nationwide installation base, recent acquisitions, and growth over the last two years have made it difficult to pinpoint the extent of incorrect R3a installations.

The engagement partner discussed the difficulty of obtaining evidence with the controller and agreed that the controller's plan was reasonable, given the low amount of available evidence.

Memo
From: ANS Controller
Date: February 15, 2012
Regarding: R3a installation warranty adjustment

_____

Evidence Gathered
We committed extensive resources to gathering information regarding the R3a installation issue. Based on the information gathered from companies with similar installation issues we initially identified a relatively wide range of incorrect installations between 25% and 85% and estimated cost per repair between $550 and $750.

Company specific inquiries of installation technicians from each region provided limited information. Inquiries revealed wide variation across offices and supports continued use of the relatively wide range identified across the industry.

Estimate
Based on this evidence, our conclusion is to record a total adjustment to warranty accrual of $7,507,500, which reflects an incorrect installation rate of 55% and an estimated repair cost of $650 per unit.

This adjustment will have a significant impact on net income. We are planning a press release to inform the market in the next week, ahead of issuing our annual report on March 1.

Warranty Accrual Adjustment		Low		High		Best Estimate
Number of R3a installations		21,000		21,000		21,000
Estimated percent of incorrect installations		25%		85%		55%
Estimated number of incorrect installations		5,250		17,850		11,550
Estimated cost per installation		$ 550		$ 750		$ 650
Estimated repair costs		**$ 2,887,500**		**$ 13,387,500**		**$ 7,507,500**
Adjustment to warranty accrual						**$ 7,507,500**

Final Note
Our estimate of $7.5 million is $5.9 million away from the high end of the range, so any variation in percent of incorrect installations or costs from our estimate could result in a material difference.

Given the wide variation observed in the limited available evidence, recording an adjustment based on the midpoint of the percent of incorrect installations and cost per repair seems reasonable at this time.

3. Moderate Uncertainty and More Evidential Support Condition

Industry Inquiry

ANS's controller inquired of similar companies to determine what they were accruing for the R3a installation issue. The controller summarized the results of those inquiries below and shared them with your audit team.

- The range of incorrect installations is quite narrow, from a low of 50% to a high of 60%.

- Estimated repair costs for each incorrect installation are between $600 and $700.

Other companies estimated the number of incorrect installations and the cost of repair based on inquiries of their installation technicians.

ANS Evidence

ANS has been performing inquiries of its own installation technicians and plans to provide your audit team that information as soon as it is completed.

ANS's nationwide installation base, recent acquisitions, and growth over the last two years have made it difficult to pinpoint the extent of incorrect R3a installations.

To get a better sense of the number of incorrect installations, the controller and his team are also performing:

- A review of R3a installation records, and

- Sending quality control inspectors into the field to physically examine a sample of R3a installations.

The engagement partner discussed the difficulty of obtaining evidence with the controller and agreed that the controller's plan was reasonable, given the moderate amount of available evidence.

Memo
From: ANS Controller
Date: February 15, 2012
Regarding: R3a installation warranty adjustment

_____

Evidence Gathered
We committed extensive resources to gathering information regarding the R3a installation issue. Based on the information gathered from companies with similar installation issues, we initially identified a relatively narrow range of incorrect installations between 50% and 60% and estimated cost per repair between $600 and $700.

Company specific information from several different sources provided considerable information.

We accumulated and analyzed the following information that we are making available to your audit team:
- Inquiries of installation technicians from each region
- Detailed review of installation records for our 600 largest projects (about 15% of R3a installations)
- Summary findings from 30 judgmentally selected site inspections by our quality control inspectors

This information revealed little variation across offices and supports continued use of the relatively narrow range identified across the industry.

Estimate
Based on this evidence, our conclusion is to record a total adjustment to warranty accrual of $7,507,500, which reflects an incorrect installation rate of 55% and an estimated repair cost of $650 per unit.

This adjustment will have a significant impact on net income. We are planning a press release to inform the market in the next week, ahead of issuing our annual report on March 1.

Warranty Accrual Adjustment		Low		High		Best Estimate
Number of R3a installations		21,000		21,000		21,000
Estimated percent of incorrect installations		50%		60%		55%
Estimated number of incorrect installations		10,500		12,600		11,550
Estimated cost per installation		$ 600		$ 700		$ 650
Estimated repair costs		**$ 6,300,000**		**$ 8,820,000**		**$ 7,507,500**
Adjustment to warranty accrual						**$ 7,507,500**

Final Note
Our estimate of $7.5 million is $1.3 million away from the high end of the range, so any variation in percent of incorrect installations or costs from our estimate will not likely result in a material difference.

Given the minimal variation observed in the extensive available evidence, recording an adjustment based on the midpoint of the percent of incorrect installations and cost per repair seems reasonable at this time.

4. Dependent Variables, and Process Measures

Evaluation of the Warranty Accrual

1. Based on the information provided, is it more likely that management's adjustment to the warranty accrual of $7,507,500 is reasonable or not reasonable?

     [ ] Reasonable
     [ ] Right on the border between Reasonable and Unreasonable.
     [ ] Not Reasonable

For all scale questions, please respond by placing a vertical slash (|) on the related scale.

2. Rate the overall reasonableness of management's $7,507,500 adjustment to the warranty accrual?

|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
  −5   −4   −3   −2   −1   0   1   2   3   4   5

Not at all   **Just Meets**   **Very**
Reasonable   **Reasonableness**   **Reasonable**
                        Threshold

3. How would you characterize management's adjustment to the warranty accrual?

|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
  0   1   2   3   4   5   6   7   8   9   10

Conservative   **Neutral /**   **Aggressive**
                 Balanced

4. How likely are you to propose an audit adjustment to the warranty accrual?

|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
  0   1   2   3   4   5   6   7   8   9   10

Not Very   **As Likely**   **Very**
Likely   **As Not**   **Likely**

5. How appropriate was management's analysis of the warranty issue?

|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
  −5   −4   −3   −2   −1   0   1   2   3   4   5

Very   **As Appropriate**   **Very**
Inappropriate   **As Not**   **Appropriate**

6. How comfortable are you with management's adjustment to the warranty accrual?

|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
  −5   −4   −3   −2   −1   0   1   2   3   4   5

Very   **As Comfortable**   **Very**
Uncomfortable   **As Not**   **Comfortable**

7. How would you assess the risk of material misstatement of the warranty accrual?

|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
  0   1   2   3   4   5   6   7   8   9   10

Low   **Somewhat**   **Average**   **Somewhat**   **Very High**
Risk   **Below Average**   **Risk**   **Above Average**   **Risk**

Evaluation of the Warranty Accrual

If you do not have a calculator available there is a calculation matrix at the back of the case materials that you can use to assist with your responses to the questions below.

1. What adjustment to the warranty accrual do you believe is most reasonable for ANS to record in the financial statements?

      Most Reasonable Adjustment: **$ _____ (in thousands)**

2. What range of adjustments to the warranty accrual would you accept as reasonable for ANS to record in the financial statements?

      Lowest Reasonable Adjustment: $ _____ (in thousands)

      Highest Reasonable Adjustment: $ _____ (in thousands)

3. What adjustment to the warranty accrual do you believe will most likely be recorded in the financial statements?

      Most Likely Adjustment: **$ _____ (in thousands)**

Please briefly explain the rationale for your answers in #1, #2 and #3 above:

_____

_____

_____

_____

_____

4. How likely is it that the final repair cost of the incorrect router installations will turn out to be *materially* different than the warranty accrual adjustment that you indicated was the 'most reasonable adjustment'?

```
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
0     1     2     3     4     5     6     7     8     9     10
```
Not Very   **As Likely**   **Very**
Likely   **As Not**   **Likely**
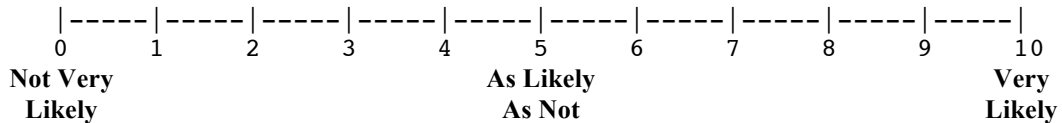
Evaluation of the Warranty Accrual

5. How difficult would it be for you to demonstrate to the following parties that the estimate you provided in question #1 on the previous page should be recorded in the financial statements?

Partner on the engagement

```
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
0     1     2     3     4     5     6     7     8     9     10
```
Not Very   **Average**   **Very**
Difficult   **Difficulty**   **Difficult**

ANS management

```
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
0     1     2     3     4     5     6     7     8     9     10
```
Not Very   **Average**   **Very**
Difficult   **Difficulty**   **Difficult**

Audit quality reviewer (i.e. PCAOB)

```
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
0     1     2     3     4     5     6     7     8     9     10
```
Not Very   **Average**   **Very**
Difficult   **Difficulty**   **Difficult**
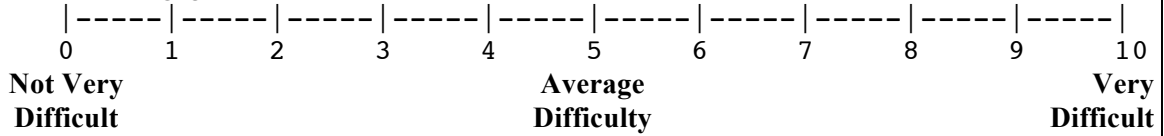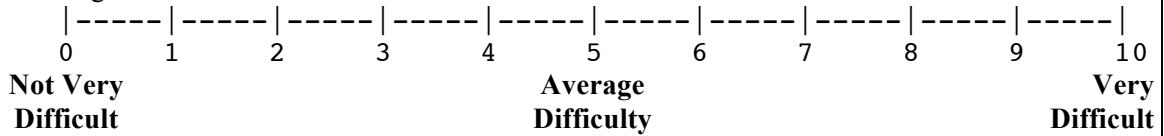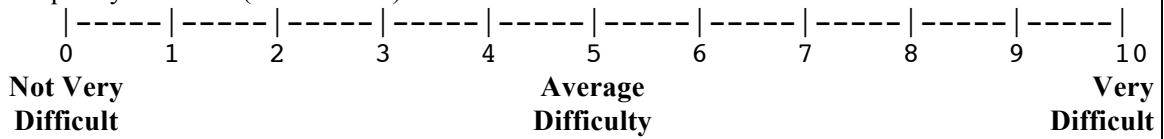
Follow Up Questions Part 1

1. How confident are you of your assessment of a material misstatement of the warranty accrual?

```
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
0     1     2     3     4     5     6     7     8     9     10
```
Not Very   Reasonably   Very
Confident   Confident   Confident

2. How adequate is the *available* audit evidence on which you can base your opinion pertaining to the warranty accrual?

```
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
0     1     2     3     4     5     6     7     8     9     10
```
Not Very   Average   Very
Adequate   Adequacy   Adequate

3. How comfortable are you with the amount of available audit evidence pertaining to the warranty accrual?

```
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
0     1     2     3     4     5     6     7     8     9     10
```
Not Very   Average Degree   Very
Comfortable   of Comfort   Comfortable

4. How much additional test work do you anticipate you would need to complete to be comfortable with the warranty accrual?

```
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
0     1     2     3     4     5     6     7     8     9     10
```
Minimal   Average   Extensive
Additional   Additional   Additional
Test Work   Test Work   Test Work

5. How much evidence is available to support the warranty accrual adjustment?

```
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
0     1     2     3     4     5     6     7     8     9     10
```
Minimal   Average   Extensive
Evidence   Evidence   Evidence
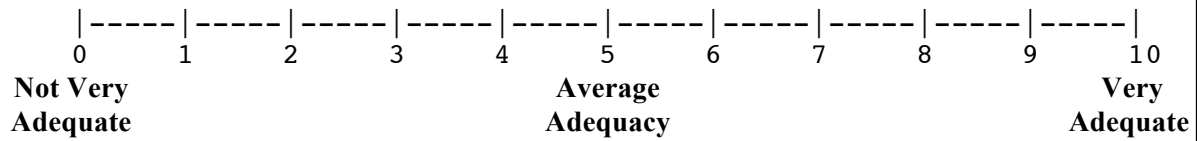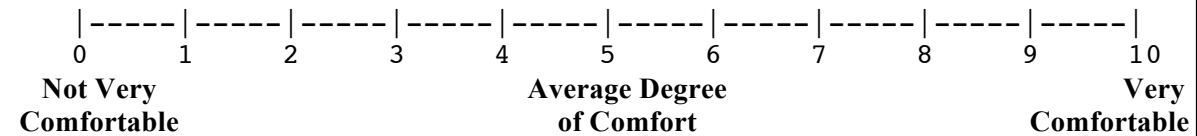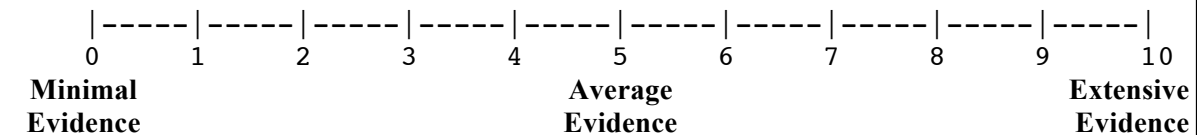
Follow Up Questions Part 2

6. How predictable is the controller's response to your evaluation of the warranty adjustment?

|----- |----- |----- |----- |----- |----- |----- |----- |----- |----- |
0   1   2   3   4   5   6   7   8   9   10

Not Very   **Average**   **Very**
Predictable   **Predictability**   **Predictable**

7. Based on the information provided, how would you rate the controller's technical accounting knowledge?

|----- |----- |----- |----- |----- |----- |----- |----- |----- |----- |
0   1   2   3   4   5   6   7   8   9   10
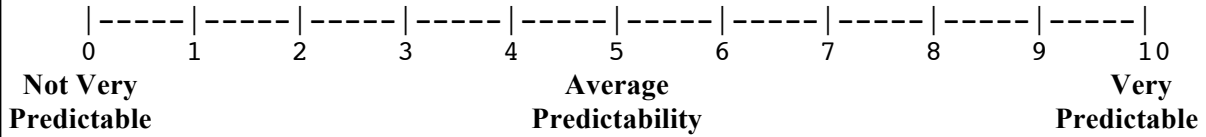
Very Weak   **Average**   **Very Strong**
Knowledge   **Knowledge**   **Knowledge**

8. Is the warranty accrual adjustment decision material to ANS's financial statements?
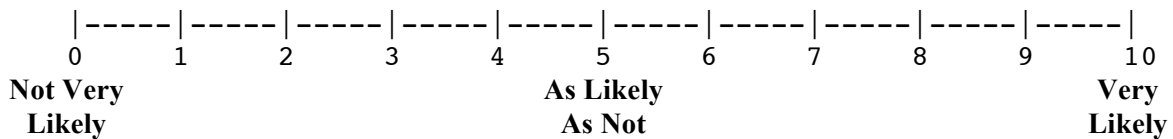
|----- |----- |----- |----- |----- |----- |----- |----- |----- |----- |
0   1   2   3   4   5   6   7   8   9   10

Not Very   **As Likely**   **Very**
Likely   **As Not**   **Likely**

9. What level of assurance are you able to provide over the warranty accrual to users of the financial statements?

|----- |----- |----- |----- |----- |----- |----- |----- |----- |----- |
0   1   2   3   4   5   6   7   8   9   10

Low   **Reasonable**   **Almost Absolute**
Assurance   **Assurance**   **Assurance**

10. What level of assurance do you believe investors perceive that you provide over the warranty accrual?

|----- |----- |----- |----- |----- |----- |----- |----- |----- |----- |
0   1   2   3   4   5   6   7   8   9   10

Low   **Reasonable**   **Almost Absolute**
Assurance   **Assurance**   **Assurance**
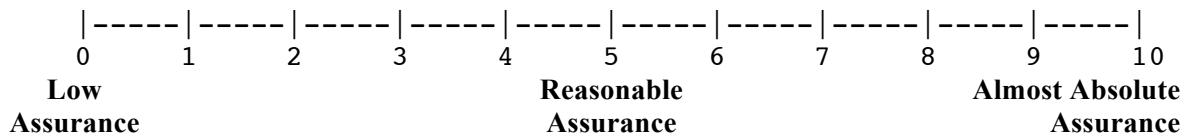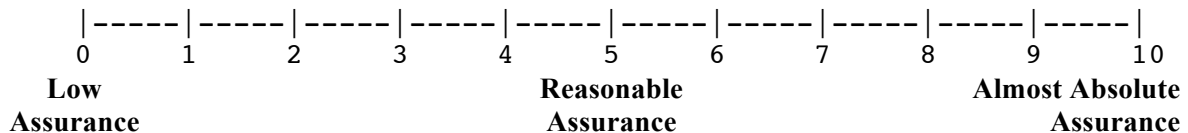
5. Manipulation Check Questions

Follow Up Questions

Please respond to the following questions by placing a check mark on the box that applies.

1. Which range of potential costs of the repair based on the industry information was discussed in this case (check the most appropriate)?

    [ ] Between 25% and 85%

    [ ] Between 50% and 60%

    [ ] Equally likely

    [ ] Other: Specify _____

2. Which of the following information did management accumulate and analyze in determining the adjustment to the warranty accrual (check the most appropriate)?

    [ ] Inquiries of installation technicians from each region

    [ ] Detailed review of installation records for our 600 largest projects (about 15% of R3a installations)

    [ ] Summary findings from 30 site inspections by our quality control inspector

    [ ] All of the above

6. Demographic Questions

Questions About Your Professional Experience

1. How many years of work experience do you have in audit or assurance services? _____

2. How many years of public company audit experience do you have? _____

3. What is your current position or job title (e.g. senior, manager, partner, etc.)?
_____

4. How familiar are you with the accounting for estimates?

```
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
0     1     2     3     4     5     6     7     8     9     10
```
Not   **Somewhat**   **Very**
Familiar   **Familiar**   **Familiar**

5. How often do you participate in discussions of important accounting issues with management (e.g. the controller)?

```
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
0     1     2     3     4     5     6     7     8     9     10
```
Never   **Sometimes**   **Very often**

Appendix B
Discussion of All Experimental Variables

1. Primary Variables of Interest and Audit Planning Variables

I study auditor judgments in the planning phase of the audit of an unusual warranty estimate and ask a series of questions regarding the planning, performance and conclusion of the audit. Table B1 of this appendix tabulates descriptive statistics and basic ANOVA results for my primary variables of interest and other variables related to auditor planning judgments. Overall, patterns of results are similar to my primary variables of interest, however statistical significance varies. In general, when uncertainty is moderate and support is less auditors are (1) less likely to require an adjustment, (2) report a lower risk of material misstatement, (3) believe that the most, the lowest and the highest appropriate adjustments are lower, and (4) less likely that the ultimate realization is materially different; however, they believe that more additional work will need to be done. Alternatively, when uncertainty is extreme and support is less auditors are (1) more likely to require an adjustment, (2) believe that the most, the lowest and the highest appropriate adjustments are higher, and (3) less likely that the ultimate realization is materially different; however, they report a slightly lower risk of material misstatement, and they believe that less additional work will need to be done. I choose the two broadest judgment questions (reasonableness and comfort) as my primary judgment variables, and the variable most closely linked to the audited financial statements (expected adjustment) as my primary dependent variables. Overall, these results provide additional support for my findings, and demonstrate the robustness of using auditor comfort as my primary variable of interest.

Reasonable

Participants responded to the question "Based on the information provided, is it more likely that management's adjustment to the warranty accrual of $7,507,500 is reasonable or not reasonable?" (1=Reasonable, 0=Right on the border between Reasonable and Unreasonable, -1=Not Reasonable). A three point reasonable (or not) question mimics the need to issue either a clean or qualified audit report. I anticipate responses to this question will be similar to the scale question. Ordinal logistic results of Reasonable are reported in footnote 17 and support H1 with a significant interaction ($z = 2.13$; $p_{one-tailed} = 0.02$); however, results do not reveal a main effect of uncertainty ($z = 0.75$; $p_{one-tailed} = 0.23$) as found using the other reasonableness measures.

Reasonableness

Participants responded to the question "Rate the overall reasonableness of management's $7,507,500 adjustment to the warranty accrual?" (-5=Not at all Reasonable, 0=Just Meets Reasonableness Threshold 5=Very Reasonable). Audit regulations require auditors to evaluate the "reasonableness" of management's estimate when providing an opinion on management's financial statements. Thus, reasonableness is a fundamental regulatory concept regarding management's estimates. ANOVA results (Table B1) provide support for my theory with a significant interaction of *Uncertainty* and *Support* ($F(1,80) = 6.97$; $p_{two-tailed} = 0.01$).

Comfort

Participants responded to the question "How comfortable are you with management's adjustment to the warranty accrual?" (-5=Very Uncomfortable, 0=As Comfortable As Not, 5=Very Comfortable). Auditors in practice frequently refer to the level of assurance as the

level of comfort over the financials. Auditor comfort is a broad measure of assurance and captures items such as the reasonableness of the estimate as well as other audit risk factors. ANOVA results (Table B1) provide support for my theory with a significant interaction of *Uncertainty* and *Support* ($F(1,80) = 4.88$; $p_{two\text{-}tailed} = 0.03$).

Likely

Participants responded to the question "How likely are you to propose an audit adjustment to the warranty accrual?" (0=Not Very Likely, 5=As Likely As Not, 10=Very Likely). This measure reflects the both the magnitude of the issue and the auditor's confidence that management's estimate is not reasonable. This also functions as a context check, as I expect participants to generally expect to propose an adjustment. Results of *Likely* provide no significant results other than a main effect of *Uncertainty* (($F(1,80) = 4.20$; $p_{two\text{-}tailed} = 0.04$). Consistent with my desired contextual manipulation, participants in all conditions believed that proposing an adjustment is at least somewhat likely (all means greater than 5).

RMM

Participants responded to the question "How would you assess the risk of material misstatement of the warranty accrual?" (0=Low Risk, 2.5=Somewhat Below Average, 5=Average Risk, 7.5=Somewhat Above Average, 10=Very High Risk). The risk of material misstatement reflects an audit planning judgment on which many other judgments are based. RMM is better defined in audit standards than are concepts such as reasonableness and comfort, but it generally only includes a subset of audit risks. Results of *RMM* provide no significant results other than a main effect of *Uncertainty* (($F(1,80) = 3.10$; $p_{two\text{-}tailed} = 0.08$).

Most

Participants responded to the question "What adjustment to the warranty accrual do you believe is most reasonable for ANS to record in the financial statements?" Auditor's most appropriate adjustment measures their conclusion based on the evidence provided, before incorporating the strength of the evidence. ANOVA results (Table B1) provide support for my theory with a significant interaction of *Uncertainty* and *Support* ($F(1,80) =$ 3.28; $p_{two-tailed} = 0.08$). Additionally, it should be noted that the average most appropriate adjustment is above materiality in all but the *Moderate* uncertainty and *Less* support condition, the condition where my theory warrants predicting that auditors are the most comfortable.

Lowest and Highest

Participants responded to the question "What range of adjustments to the warranty accrual would you accept as reasonable for ANS to record in the financial statements?" (Lowest Reasonable Adjustment, Highest Reasonable Adjustment). I measure the range of reasonable adjustments to capture auditor perception of the uncertainty of the estimate and to measure the lowest adjustment that the auditor would accept, because there is a chance that an aggressive manager may be able to push the adjustment down to that level. Auditor's *Lowest* appropriate adjustments were all very similar with no significant main or interaction affects (all *p-values* > 0.30). However, The pattern of results for *Highest* and the ANOVA results (Table B1) provide support for my theory with a significant interaction of *Uncertainty* and *Support* ($F(1,80) = 3.88$; $p_{two-tailed} = 0.05$).

Expected Adjustment

Participants responded to the question "What adjustment to the warranty accrual do you believe will most likely be recorded in the financial statements?" I measure the adjustment the auditor perceives as the most likely to be recorded in the financial statements to get a close as possible to the estimate amount that will be recorded in the audited financial statements. This measure incorporates the auditor's perception of the most appropriate estimate and the strength of their position. Results for auditors' *Expected Adjustment* are discussed in the Chapter 4 of the dissertation and tabulated in Table 2.

Different

Participants responded to the question "How likely is it that the final repair cost of the incorrect router installations will turn out to be materially different than the warranty accrual adjustment that you indicated was the 'most reasonable adjustment'? " (0=Not Very Likely, 5=As Likely As Not, 10=Very Likely). I measure the auditor's perception of the uncertainty of the estimate in relation to the point estimate. This provides a manipulation check for uncertainty and captures the perception of the risk associated with being materially different than the outcome. Consistent with the uncertainty manipulation, participants in the *Extreme* uncertainty condition perceived the expected final cost as significantly more likely to be materially different than the estimate than participants in the *Moderate* uncertainty condition ($F(1,80) = 4.80$; $p_{two\text{-}tailed} = 0.01$). There is no indication of an interaction between *Uncertainty* and *Support* on auditors anticipated difference between the estimate and the final cost ($F(1,80) = 0.12$; $p_{two\text{-}tailed} = 0.74$).

Additional Work

Participants responded to the question "How much additional test work do you anticipate you would need to complete to be comfortable with the warranty accrual?" (11-point scale, 0=Minimal additional work, 5=Average additional work, 10=Extensive additional work). I measure the amount of additional work the auditor expects, related to the estimate. Similar to the risk of material misstatement, this is a direct audit planning judgment and captures the extent to which my manipulations influence planned evidence-gathering activities. Auditor's evaluations of the *Additional Work* were all very similar with no significant main or interaction affects (all *p-values* > 0.13) and were assessed as significantly above average additional work in all conditions (*Extreme/More*, $t(20) = 8.43$ $p_{two-tailed} < 0.01$; *Extreme/Less*, $t(18) = 9.00$ $p_{two-tailed} < 0.01$; *Moderate/More*, $t(20) = 5.96$ $p_{two-tailed} < 0.01$; *Moderate/Less*, $t(20) = 9.61$ $p_{two-tailed} < 0.01$).

2. Variables Used to Compose Systematic Processing Measure

I capture six variables to compose my measure of systematic reasoning. Table B2 of this appendix tabulates descriptive statistics and basic ANOVA results for the six variables used to compose my measure of systematic reasoning. In contrast to the variables discussed in Section 1, these variables represent auditor evaluation of the inputs into management's estimate. As I note in the discussion of results, auditor evaluations of the inputs to management's estimate are quite different than their resulting planning level judgments. Although not always significant, when support is less, auditors perceive (1) management as more aggressive, (2) management's estimate as less appropriate, (3) the support as less adequate, (4) there being less available evidence, and are (5) less confident in the risk assessment, and (6) less comfortable with the evidence, regardless of the level of

uncertainty. Overall, these results demonstrate an expected pattern where auditors prefer more support to less support.

Aggressive

Participants responded to the question "How would you characterize management's adjustment to the warranty accrual?" (0=Conservative, 5=Neutral/Balanced, 10=Aggressive). I measure auditor's perception of the aggressiveness of management's estimate to capture the extent to which management aggressiveness is driving auditor comfort. In the experiment, management chooses an estimate based on the midpoint of the inputs, and thus I do not anticipant that auditors perceive them as overly aggressive. Auditor's evaluations of management's aggressiveness were all very similar across conditions, with no significant main or interaction affects (all *p-values* > 0.35).

Appropriate

Participants responded to the question "How appropriate was management's analysis of the warranty issue?" (-5=Very Inappropriate, 0=As Appropriate As Not, 5=Very Appropriate). I measure the appropriateness of management's estimate to capture the extent to which management's actual evaluation of the estimate is driving auditor comfort. Auditor's evaluations of the appropriateness of management's analysis were significantly affected by the level of Uncertainty ($F(1,80) = 5.66$, $p_{two-tailed} = 0.02$), but were unaffected by *Support* ($F(1,80) = 0.32$, $p_{two-tailed} = 0.57$) and had no interactive affect ($F(1,80) = 0.26$, $p_{two-tailed} = 0.61$).

Confident

Participants responded to the question "How confident are you of your assessment of a material misstatement of the warranty accrual?" (0=Not Very Confident, 5=Reasonably

Confident, 10=Very Confident). I measure auditor confidence to understand the extent to which auditor confidence is driving their comfort. Earlier studies examining judgment under uncertainty use confidence as a measure of the effect of uncertainty on individual judgment (e.g. Budescu et al. 2003). To the extent auditor confidence captures auditor uncertainty aversion, prior research predicts that auditors will be more confident with less uncertainty and more support (e.g. Kinney and Martin 1994; Hirst 1994; Barron, Pratt and Stice 2001; Smith and Kida 1991). As expected under uncertainty aversion, ANOVA results show that auditors are more confident when there is more *Support* ($F(1,80) = 5.52$, $p_{two-tailed} = 0.02$), and less *Uncertainty* ($F(1,80) = 4.84$, $p_{two-tailed} = 0.03$), and more *Support* has a greater influence under *Extreme* uncertainty ($F(1,80) = 2.99$, $p_{two-tailed} = 0.09$).

Adequate

Participants responded to the question "How adequate is the available audit evidence on which you can base your opinion pertaining to the warranty accrual?" (0=Not Very Adequate, 5=Average Adequacy, 10=Very Adequate). I measure auditor perceptions of the adequacy of the evidence to measure the extent to which auditor perceptions of the quality of evidence is driving auditor comfort. Consistent with my manipulation, participants indicated that they were more comfortable in the *More* condition (mean = 3.9) than the *Less* condition (mean = 3.0) ($F(1,80) = 4.62$; $p_{two-tailed} < 0.04$). The ANOVA shows that auditors are more comfortable with the evidence when there is less *Uncertainty* ($F(1,80) = 5.62$, $p_{two-tailed} = 0.04$); however, inconsistent with auditor comfort there is no interaction affect of *Support* and *Uncertainty* ($F(1,80) = 0.40$, $p_{two-tailed} = 0.53$).

Comfort_Evidence

Participants responded to the question "How comfortable are you with the amount of available audit evidence pertaining to the warranty accrual?" (0=Not Very Comfortable, 5=Average Degree of Comfort, 10=Very Comfortable). I measure the auditor' comfort with the evidence to measure the extent to which the auditor's overall perception of the evidence is driving auditor comfort. Consistent with my manipulation, participants indicated that they were more comfortable in the *More* condition (mean = 3.9) than the *Less* condition (mean = 3.1) ($F(1,80) = 4.04$; $p_{two-tailed} < 0.05$). The ANOVA shows that auditors are more comfortable with the evidence when there is less *Uncertainty* ($F(1,80) = 5.48$, $p_{two-tailed} = 0.02$), but there is no interaction affect of *Support* and *Uncertainty* ($F(1,80) = 1.49$, $p_{two-tailed} = 0.23$).

Avail_Evidence

Participants responded to the question "How much evidence is available to support the warranty accrual adjustment?" (0=Minimal Evidence, 5=Average Evidence, 10=Extensive Evidence). I measure the auditor' perception of the amount of the evidence to measure the extent to which the auditor's perception of the quantity of evidence is driving auditor comfort. Consistent with my manipulation, participants indicated that there was more support in the *More* condition (mean = 4.4) than the *Less* condition (mean = 3.0) ($F(1,80) = 13.91$; $p_{two-tailed} < 0.01$), and this holds for both levels of estimate uncertainty (moderate, $F(1,42) = 6.36$; $p_{two-tailed} = 0.02$; extreme, $F(1,38) = 7.45$; $p_{two-tailed} = 0.01$). The ANOVA shows that auditors perceive more evidence when there is less *Uncertainty* ($F(1,80) = 3.69$, $p_{two-tailed} = 0.06$), but there is no interaction effect of *Support* and *Uncertainty* ($F(1,80) = 0.14$, $p_{two-tailed} = 0.71$).

3. Context Check and Other Variables

I collect a series of context checks and other variables that could interact or affect my primary variables of interest. Table B3 of this appendix tabulates descriptive statistics and basic ANOVA results for other variables collected during the experiment.

Dem_Partner, Dem_Mgt, Dem_Reviewer

Participants responded to the question "How difficult would it be for you to demonstrate to the following parties that the estimate you provided in question #1 on the previous page should be recorded in the financial statements?" (Partner on the engagement, ANS management, Audit quality reviewer (i.e. PCAOB)) (0=Not Very Difficult, 5=Average Difficulty, 10=Very Difficult). I captured several accountability variables because accountability can create perverse incentives that alter judgments from what would otherwise be considered normative (Learner and Tetlock 1999). Specifically, I measure the extent to which auditors felt they could defend their adjustment to the (1) engagement partner, (2) management, and (3) a quality reviewer. ANOVA results controlling for the accountability measures does not significantly alter the results reported in the paper. The interaction affect of uncertainty and support on auditor comfort remains significant when controlling for each accountability measure (partner: $F(1,79) = 6.98$; $p_{one\text{-}tailed} < 0.01$; management: $F(1,79) = 5.91$; $p_{one\text{-}tailed} = 0.01$; reviewer: $F(1,79) = 5.85$; $p_{one\text{-}tailed} = 0.01$). Similarly, the interaction affect of uncertainty and support on auditors expected adjustment remains significant when controlling for each accountability measure (partner: $F(1,79) = 8.17$; $p_{one\text{-}tailed} < 0.01$; management: $F(1,79) = 5.52$; $p_{one\text{-}tailed} = 0.01$; reviewer: $F(1,79) = 7.97$; $p_{one\text{-}tailed} < 0.01$). Overall, my results are robust to controlling for auditor

accountability to key constituencies, further supporting the theory that auditor judgments are being driven by the extent of systematic reasoning.

Predictable

Participants responded to the question "How predictable is the controller's response to your evaluation of the warranty adjustment?" (0=Not Very Predictable, 5=Average Predictability, 10=Very Predictable). I measure the predictability of the controller's actions as differences in predictability could influence auditor perceptions of the overall uncertainty and also their comfort with management's estimate (Berger 2005). Controlling for the predictability of management does not significantly alter the results of H1 (interaction of uncertainty and support on auditor comfort $F(1,79) = 7.42$; $p_{one\text{-}tailed} < 0.01$), or interaction of uncertainty and support on expected adjustment ($F(1,79) = 5.95$; $p_{one\text{-}tailed} = 0.01$).

Knowledge

Participants responded to the question "Based on the information provided, how would you rate the controller's technical accounting knowledge?" (0=Very Weak Knowledge, 5=Average Knowledge, 10=Very Strong Knowledge). there was no significant difference in perceptions of management knowledge between conditions (i.e. all $p_{two\text{-}tailed} \geq$ 0.17), and controlling for knowledge does not significantly alter the interaction of Support and Uncertainty on auditor comfort ($F(1,80) = 6.84$, $p_{one\text{-}tailed} < 0.01$).

Material

Participants responded to the question "Is the warranty accrual adjustment decision material to ANS's financial statements?" (0=Not Very Likely, 5=As Likely As Not, 10=Very Likely). I measure the materiality of the estimate to ensure that auditor comfort is not driven by the estimate being not material in some of my conditions. Participants

believed the adjustment was material (0=Not Very Likely, 5=As Likely As Not, 10=Very Likely; mean=8.2), and there was no significant difference in materiality evaluations between conditions (i.e. all $p_{two\text{-}tailed} \geq 0.34$).

User_Assur

Participants responded to the question "What level of assurance are you able to provide over the warranty accrual to users of the financial statements?" (0=Low Assurance, 5=Reasonable Assurance, 10=Almost Absolute Assurance). I measure the level of assurance auditors perceive they provide to contribute to the ongoing discussion of auditors disclosing the level of assurance for financial statement items. Measuring this also contributes to the auditor comfort literature by directly tying auditor's perception of the level of assurance to auditor comfort. I discuss the results of the level of assurance auditor perceive they provide to users of the financial statements in Chapter 4.3, and tabulate results in Table 3.

Investor_Assur

Participants responded to the question "What level of assurance do you believe investors perceive that you provide over the warranty accrual?" (0=Low Assurance, 5=Reasonable Assurance, 10=Almost Absolute Assurance). I measure the auditor's perception of the level of assurance presumed by investors to measure the extent to which auditors anticipate users perceptions of levels of assurance. This measure, when compared to the level of assurance that auditors believe they provide, seeks to capture some aspect of the expectations gap. Somewhat interestingly, I find no significant affect of either the level of uncertainty or the degree of management evidentiary support on auditor perception of the level of assurance perceived by investors (all *p-values* > 0.28).

Table B1. Primary Variables of Interest and Audit Planning Variables

	Reasonable**	Reasonableness	Comfort	Likely	RMM	Most	Lowest	Highest	Expected Adjustment	Different	Additional Work
	Mean	Mean	Mean	Mean	Mean	Mean*	Mean*	Mean*	Mean*	Mean	Mean
Extreme/More	-0.15	-0.02	-0.23	6.47	8.12	2,161	212	4,033	772	6.00	7.64
Extreme/Less	-0.47	-1.36	-1.38	7.00	8.00	2,632	366	4,632	1,596	5.38	7.65
Moderate/More	0.05	0.08	-0.02	5.58	7.57	1,356	88	2,326	860	4.68	6.92
Moderate/Less	0.48	1.19	0.82	5.75	7.47	714	-260	1,574	387	4.36	7.45

	Reasonable**	Reasonableness	Comfort	Likely	RMM	Most	Lowest	Highest	Expected Adjustment	Different	Additional Work
	p-value / std. error / *z*	*p-value* / std. error / *F*	*p-value* / std. error / *F*	*p-value* / std. error / *F*	*p-value* / std. error / *F*	*p-value* / std. error / *F*	*p-value* / std. error / *F*	*p-value* / std. error / *F*	*p-value* / std. error / *F*	*p-value* / std. error / *F*	*p-value* / std. error / *F*
Support	0.20 / 0.62 / -1.28	0.81 / 0.46 / 0.06	0.73 / 0.45 / 0.12	0.50 / 0.52 / 0.46	0.72 / 0.31 / 0.14	0.78 / 308.25 / 0.08	0.79 / 361.82 / 0.07	0.82 / 342.88 / 0.05	0.50 / 255.45 / 0.48	0.29 / 0.44 / 1.14	0.37 / 0.30 / 0.81
Uncertainty	0.46 / 0.57 / 0.75	0.01 / 0.46 / 8.12	0.01 / 0.45 / 7.18	0.04 / 0.52 / 4.20	0.08 / 0.31 / 3.10	0.00 / 308.25 / 19.54	0.30 / 361.82 / 1.08	0.00 / 342.88 / 48.30	0.03 / 255.45 / 4.80	0.01 / 0.44 / 7.18	0.13 / 0.30 / 2.40
Support* Uncertainty	0.03 / 0.87 / 2.13	0.01 / 0.23 / 6.97	0.03 / 0.23 / 4.88	0.73 / 0.26 / 0.12	0.97 / 0.15 / 0.00	0.08 / 154.13 / 3.28	0.49 / 180.91 / 0.49	0.05 / 171.44 / 3.88	0.01 / 127.72 / 6.45	0.74 / 0.22 / 0.12	0.40 / 0.15 / 0.72
Residual	0.41	0.12 / 0.40 / 2.50	0.07 / 0.39 / 3.50	0.00 / 0.45 / 210.25	0.00 / 0.27 / 940.65	0.00 / 265.64 / 84.27	0.28 / 312.98 / 1.17	0.00 / 296.59 / 217.27	0.00 / 220.96 / 24.60	0.00 / 0.38 / 239.32	0.00 / 0.26 / 848.56
N	80	84	84	84	84	83	84	84	84	83	84

All *p-values* two-tailed
* Means adjusted for the amount of management's adjustment.
** Reasonable is a three level variable; results reported are from an ordinal logistic regression.

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Variable Definitions

Reasonable = Based on the information provided, is it more likely that management's adjustment to the warranty accrual of $7,507,500 is reasonable or not reasonable? (1=Reasonable, 0=Right on the border between Reasonable and Unreasonable, -1=Not Reasonable)

Reasonableness = Rate the overall reasonableness of management's $7,507,500 adjustment to the warranty accrual? (11-point scale, -5=Not at all Reasonable, 0=Just Meets Reasonableness Threshold 5=Very Reasonable)

Comfort = How comfortable are you with management's adjustment to the warranty accrual? (11-point scale, -5=Very Uncomfortable, 0=As Comfortable As Not, 5=Very Comfortable)

Likely = How likely are you to propose an audit adjustment to the warranty accrual? (11-point scale, 0=Not Very Likely, 5=As Likely As Not, 10=Very Likely)

RMM = How would you assess the risk of material misstatement of the warranty accrual? (11-point scale, 0=Low Risk, 2.5=Somewhat Below Average, 5=Average Risk, 7.5=

Most = What adjustment to the warranty accrual do you believe is most reasonable for ANS to record in the financial statements?

Lowest and Highest = What range of adjustments to the warranty accrual would you accept as reasonable for ANS to record in the financial statements? (Lowest Reasonable Adjustment, Highest Reasonable Adjustment)

Expected Adjustment = What adjustment to the warranty accrual do you believe will most likely be recorded in the financial statements?

Different = How likely is it that the final repair cost of the incorrect router installations will turn out to be materially different than the warranty accrual adjustment that you indicated was the 'most reasonable adjustment'? (11-point scale, 0=Not Very Likely, 5=As Likely As Not, 10=Very Likely)

Additional work = How much additional test work do you anticipate you would need to complete to be comfortable with the warranty accrual? (11-point scale, 0=Minimal additional work, 5=Average additional work, 10=Extensive additional work)

Table B2. Variables Used to Compose Systematic Processing Measure

	Aggressive	Appropriate	Confident	Adequate	Comfort_Evidence	Avail_Evidence
	Mean	Mean	Mean	Mean	Mean	Mean
Extreme/More	5.50	0.33	5.52	3.52	3.66	4.14
Extreme/Less	5.69	-0.18	3.58	2.27	2.29	2.56
Moderate/More	5.27	1.20	5.74	4.30	4.13	4.74
Moderate/Less	5.29	1.18	5.45	3.62	3.80	3.45

	Aggressive	Appropriate	Confident	Adequate	Comfort_Evidence	Avail_Evidence
	p-value / std. error / *F*	*p-value* / std. error / *F*	*p-value* / std. error / *F*	*p-value* / std. error / *F*	*p-value* / std. error / *F*	*p-value* / std. error / *F*
Support	0.74 / 0.33 / 0.11	0.57 / 0.47 / 0.32	0.02 / 0.48 / 5.52	0.04 / 0.45 / 4.62	0.05 / 0.42 / 4.04	0.00 / 0.39 / 13.91
Uncertainty	0.35 / 0.33 / 0.90	0.02 / 0.47 / 5.66	0.03 / 0.48 / 4.84	0.02 / 0.45 / 5.62	0.02 / 0.42 / 5.48	0.06 / 0.39 / 3.69
Support*Uncertainty	0.79 / 0.17 / 0.07	0.61 / 0.23 / 0.27	0.09 / 0.24 / 2.99	0.53 / 0.22 / 0.40	0.23 / 0.21 / 1.49	0.71 / 0.19 / 0.14
Residual	0.00 / 0.29 / 379.08	0.61 / 0.41 / 0.26	0.00 / 0.41 / 154.26	0.00 / 0.39 / 75.86	0.00 / 0.37 / 86.12	0.00 / 0.33 / 149.57
N	82	84	84	84	84	84

All *p-values* two-tailed

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Variable Definitions

Aggressive = How would you characterize management's adjustment to the warranty accrual? (11-point scale, 0=Conservative, 5=Neutral/Balanced, 10=Aggressive)

Appropriate = How appropriate was management's analysis of the warranty issue? (11-point scale, -5=Very Inappropriate, 0=As Appropriate As Not, 5=Very Appropriate)

Confident = How confident are you of your assessment of a material misstatement of the warranty accrual? (11-point scale, 0=Not Very Confident, 5=Reasonably Confident, 10=Very Confident)

Adequate = How adequate is the available audit evidence on which you can base your opinion pertaining to the warranty accrual? (11-point scale, 0=Not Very Adequate, 5=Average Adequacy, 10=Very Adequate)

Comfort_Evidence = How comfortable are you with the amount of available audit evidence pertaining to the warranty accrual? (11-point scale, 0=Not Very Comfortable, 5=Average Degree of Comfort, 10=Very Comfortable)

Avail_Evidence = How much evidence is available to support the warranty accrual adjustment? (11-point scale, 0=Minimal Evidence, 5=Average Evidence, 10=Extensive Evidence)

Table B3. Other Variables

	Dem_Partner	Dem_Mgt	Dem_Reviewer	Predictable	Knowledge	Material	User_Assur	Investor_Assur
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Extreme/More	6.00	6.77	6.06	6.24	5.18	8.27	4.31	7.19
Extreme/Less	5.38	6.91	7.26	6.64	4.46	8.09	3.66	6.96
Moderate/More	4.68	6.56	5.60	6.61	5.45	7.88	4.52	7.44
Moderate/Less	4.36	5.30	4.37	6.32	5.22	8.38	4.93	7.73
	p-value	*p-value*	*p-value*	*p-value*	*p-value*	*p-value*	*p-value*	*p-value*
	std. error	std. error	std. error	std. error	std. error	std. error	std. error	std. error
	F	F	F	F	F	F	F	F
Support	0.57	0.36	0.98	0.92	0.20	0.66	0.78	0.94
	0.50	0.61	0.50	0.50	0.37	0.36	0.41	0.47
	0.34	0.86	0.00	0.01	1.66	0.19	0.08	0.00
Uncertainty	0.00	0.14	0.00	0.96	0.17	0.88	0.07	0.28
	0.50	0.61	0.50	0.50	0.37	0.36	0.41	0.47
	9.18	2.25	11.09	0.00	1.96	0.02	3.31	1.19
Support*Uncertainty	0.32	0.25	0.02	0.50	0.52	0.35	0.19	0.58
	0.25	0.30	0.25	0.25	0.19	0.18	0.20	0.23
	1.00	1.32	5.90	0.46	0.42	0.88	1.72	0.31
Residual	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.43	0.53	0.44	0.43	0.32	0.31	0.35	0.40
	187.42	183.60	230.74	219.34	250.91	674.44	133.17	305.55
N	84	84	82	84	84	83	84	84

All *p-values* two-tailed

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Variable Definitions

Dem_Partner, Dem_Mgt, Dem_Reviewer = How difficult would it be for you to demonstrate to the following parties that the estimate you provided in question #1 on the previous page should be recorded in the financial statements? (Partner on the engagement, ANS management, Audit quality reviewer (i.e. PCAOB)) (11-point scale, 0=Not Very Difficult, 5=Average Difficulty, 10=Very Difficult)

Predictable = How predictable is the controller's response to your evaluation of the warranty adjustment? (11-point scale, 0=Not Very Predictable, 5=Average Predictability, 10=Very Predictable)

Knowledge = Based on the information provided, how would you rate the controller's technical accounting knowledge? (11-point scale, 0=Very Weak Knowledge, 5=Average Knowledge, 10=Very Strong Knowledge)

Material = Is the warranty accrual adjustment decision material to ANS's financial statements? (11-point scale, 0=Not Very Likely, 5=As Likely As Not, 10=Very Likely)

User_Assur = What level of assurance are you able to provide over the warranty accrual to users of the financial statements? (11-point scale, 0=Low Assurance, 5=Reasonable Assurance, 10=Almost Absolute Assurance)

Investor_Assur = What level of assurance do you believe investors perceive that you provide over the warranty accrual? (11-point scale, 0=Low Assurance, 5=Reasonable Assurance, 10=Almost Absolute Assurance)

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Figures

Figure 1
Graphical Representation of Prediction

Panel A, Graphical representation of context
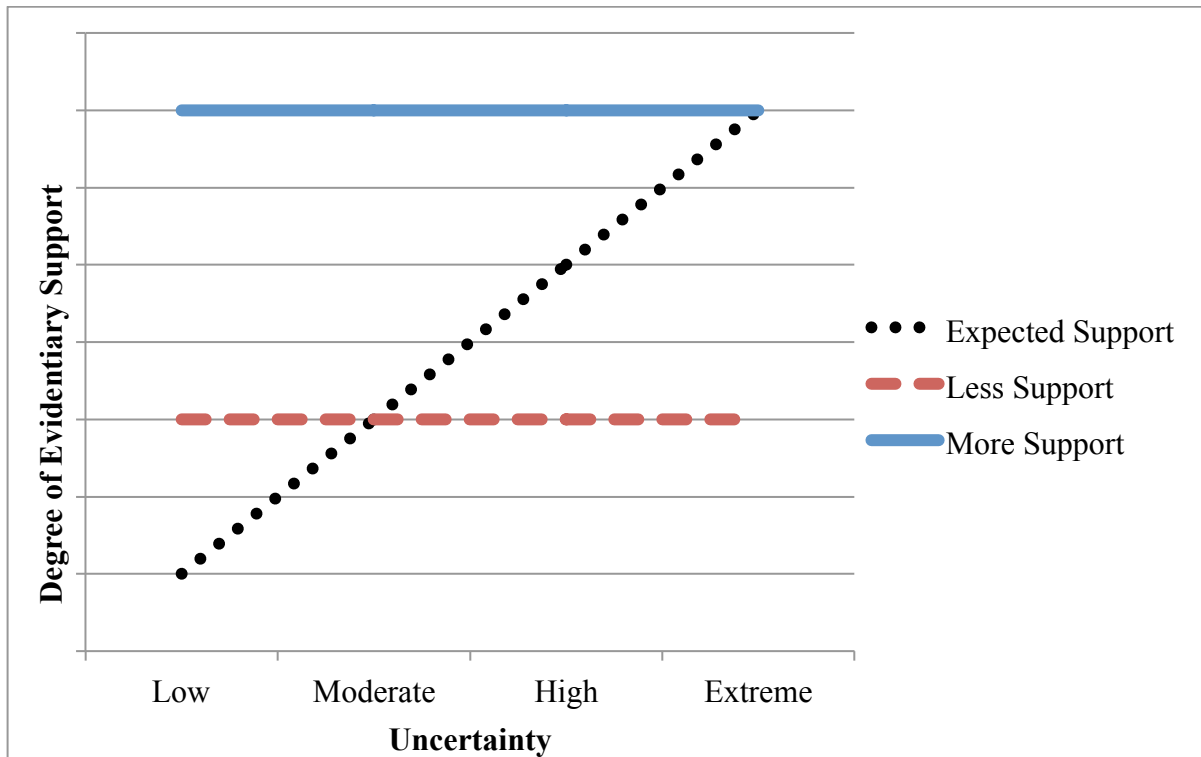
This figure depicts a graphical representation of my context. The *x*-axis represents the level of uncertainty and the *y*-axis represents the degree of management's evidential support. The diagonal dotted line represents the auditor's expectation; as estimate uncertainty increases, the auditor expects higher degrees of evidential support. The upper solid line and lower dashed line represent more and less evidential support provided by management, respectively.

Figure 1 (cont.)
Graphical Representation of Prediction

Panel B, Graphical representation of theoretical predictions
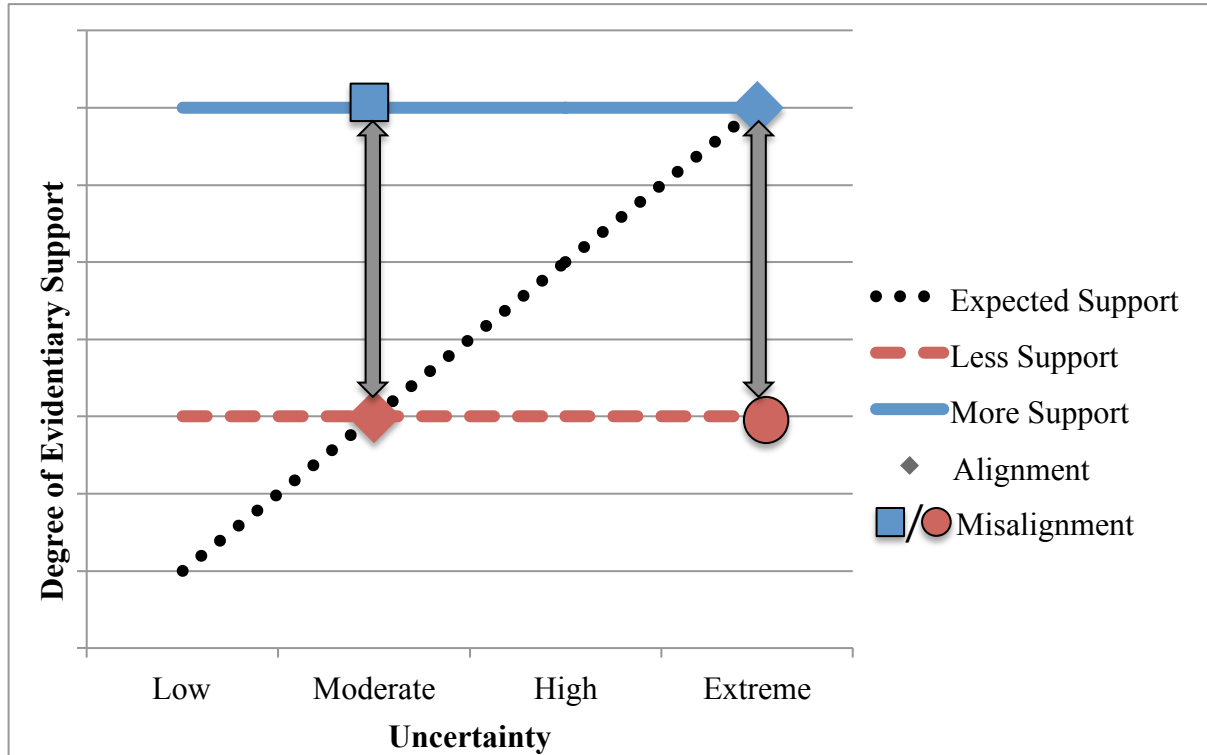
This figure depicts a graphical representation of my context and theoretical predication. The *x*-axis represents the level of uncertainty and the *y*-axis represents the degree of management's evidential support. The diagonal dotted line represents the auditor's expectation; as estimate uncertainty increases, the auditor expects higher degrees of evidential support. The upper solid line and lower dashed line represent more and less evidential support provided by management, respectively.

My theory predicts that points along the auditor's expectation line elicit lower systematic processing than points not on the expectation line. The diamonds represent the points where management's evidentiary support and auditor expectations for support, given the level of uncertainty, are aligned. The square represents misalignment by seemingly 'too much' evidential support given the level of estimate uncertainty; whereas, the circle represents misalignment by seemingly 'too little' evidential support. The arrows between the diamonds and the square or circle (depending on condition) represent misalignment, and thus the extent of auditor discomfort.

Figure 2
Results of H1
Auditor Comfort with Management's Estimate
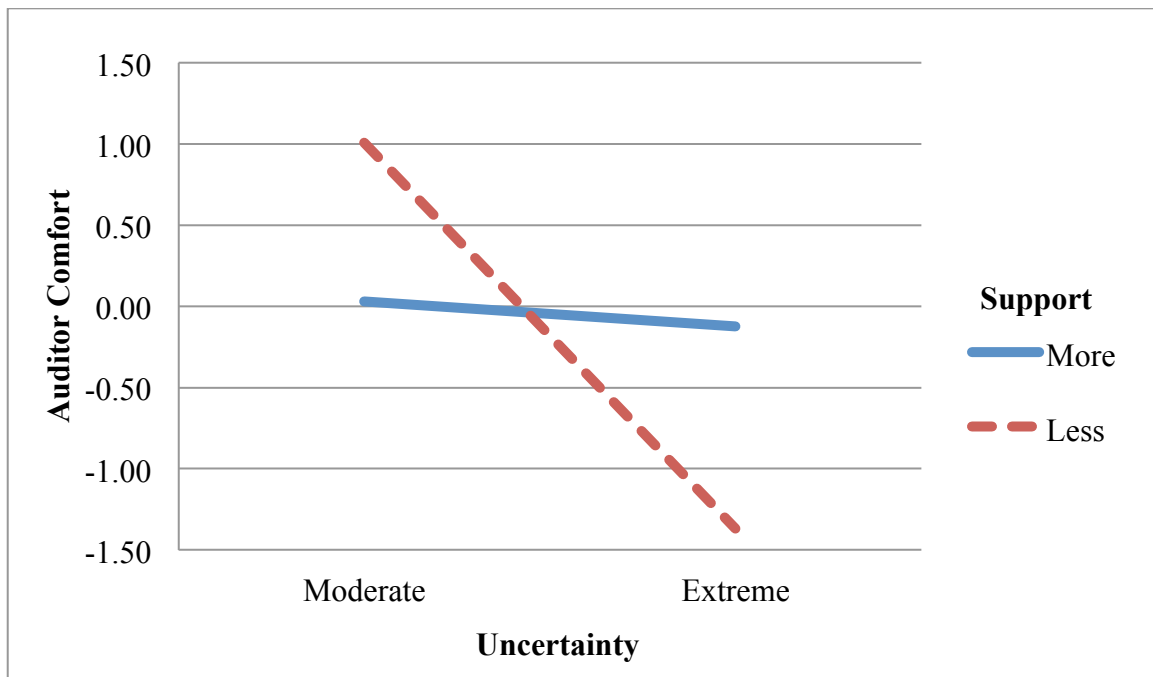
The dependent variable, auditor comfort, is the average of two questions pertaining to management's warranty accrual: (1) "Rate the overall reasonableness of management's $7,507,500 adjustment to the warranty accrual?" and (2) "How comfortable are you with management's adjustment to the warranty accrual?"

Support is manipulated by varying the support management provides for their estimate. In the *More* condition the estimate is based on industry information, inquiry of technicians, review of records, and site inspections, while in the *Less* condition the estimate is based on only industry information and inquiry.

Uncertainty is manipulated by providing information about potential costs to resolve the warranty issue that revealed either *Moderate* uncertainty (between $6.3 million and $8.8 million) or *Extreme* uncertainty (between $2.9 million and $13.4 million).

Figure 3
Results of H2
Mediating Role of Auditor Comfort on Expected Adjustment
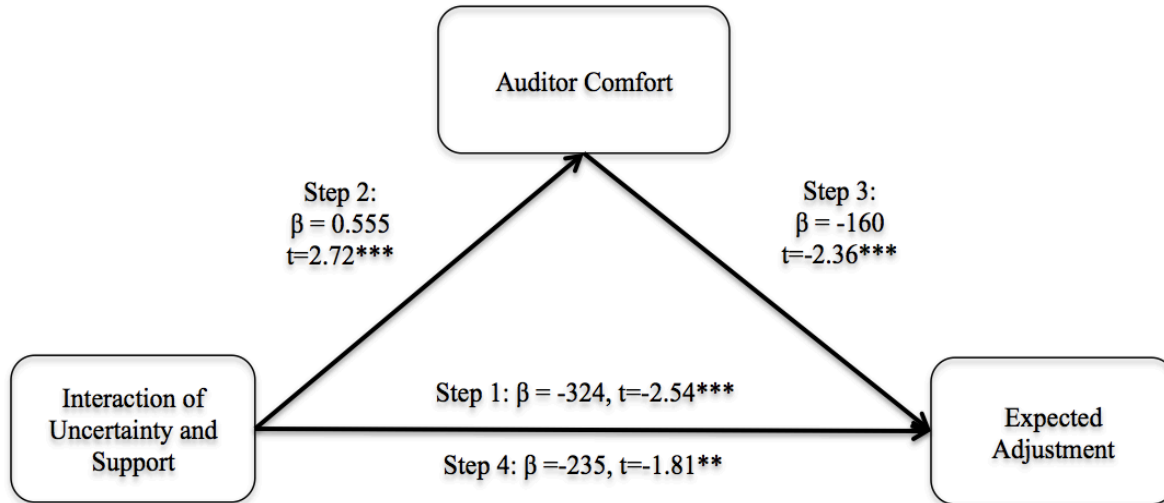
***, ** represent one-tailed statistical significance at 0.01, and 0.05 levels respectively.

This figure presents results of a mediation analysis using Baron and Kenny's four-step process (Baron and Kenny 1986).

My primary independent variable is the interaction of management's evidentiary support (*Support*) and the level of estimate uncertainty (*Uncertainty*). *Support* is manipulated by varying the support management provides for their estimate, either *More* or *Less*. In the *More* condition, the estimate is based on industry information, inquiry of technicians, review of records, and site inspections, while in the *Less* condition the estimate is based on only industry information and inquiry. *Uncertainty* is manipulated by providing information about potential costs to resolve the warranty issue that reveals either *Moderate* uncertainty (between $6.3 million and $8.8 million) or *Extreme* uncertainty (between $2.9 million and $13.4 million).

The dependent variable, Expected Adjustment, is participants' response to the following question (in thousands) "What adjustment to the warranty accrual do you believe will most likely be recorded in the financial statements?"

Auditor comfort is the average of two questions designed to illicit participant's overall comfort with management's warranty accrual. The two questions were (1) "Rate the overall reasonableness of management's $7,507,500 adjustment to the warranty accrual?" and (2) "How comfortable are you with management's adjustment to the warranty accrual?"

Tables

Table 1
H1: Auditor Comfort

Panel A: Descriptive statistics for auditor comfort with management's estimate

			Support		
			Less	*More*	Total
Uncertainty	*Extreme*	Mean	-1.37	-0.12	-0.72
		Standard Deviation	1.80	1.94	1.95
		Sample size	19	21	40
	Moderate	Mean	1.01	0.03	0.52
		Standard Deviation	1.52	2.17	1.91
		Sample size	22	22	44
	Total	Mean	-0.09	-0.05	-0.07
		Standard Deviation	2.02	2.03	2.02
		Sample size	41	43	84

Panel B: ANOVA results

Factor	df	MS	F	*p-value*
Support	1	0.37	0.11	0.37
Uncertainty	1	33.45	9.55	<0.01
Support*Uncertainty	1	25.83	7.38	<0.01
Residual	80	3.50		

Panel C: Contrast test results

Contrast	df	F	*p-value*
Support, Uncertainty=Extreme	1	4.41	0.02
Support, Uncertainty=Moderate	1	3.13	0.04

This table presents descriptive statistics, basic ANOVA, and follow-up simple effect test results for auditor comfort. All *p-values* are one-tailed.

The dependent variable, auditor comfort, is the average of two questions designed to illicit participant's overall comfort with management's warranty accrual (both on an 11-point scale). The two questions were (1) "Rate the overall reasonableness of management's $7,507,500 adjustment to the warranty accrual?" and (2) "How comfortable are you with management's adjustment to the warranty accrual?"

Support is manipulated by varying the support management provides for their estimate. In the *More* condition, the estimate is based on industry information, inquiry of technicians, review of records, and site inspections, while in the *Less* condition the estimate is based on only industry information and inquiry.

Uncertainty is manipulated by providing information about potential costs to resolve the warranty issue that revealed either *Moderate* uncertainty (between $6.3 million and $8.8 million) or *Extreme* uncertainty (between $2.9 million and $13.4 million).

Table 2
Expected Adjustment

Panel A: Descriptive statistics for auditor's expected adjustment to management's estimate

			Support		
			Less	*More*	Total
Uncertainty	*Extreme*	Mean	1,596	772	1,163
		Standard Deviation	1,398	1,264	1,376
		Sample size	19	21	40
	Moderate	Mean	387	860	623
		Standard Deviation	749	1,202	1,018
		Sample size	22	22	44
	Total	Mean	947	817	880
		Standard Deviation	1,244	1,218	1,225
		Sample size	41	43	84

Panel B: ANOVA results

Factor	df	MS	F	*p-value*
Support	1	640,725	0.47	0.25
Uncertainty	1	6,572,919	4.81	0.02
Support*Uncertainty	1	8,803,963	6.45	0.01
Residual	80	1,365,424		

Panel C: Contrast test results

Contrast	df	F	*p-value*
Support, Uncertainty=Extreme	1	4.96	0.01
Support, Uncertainty=Moderate	1	1.81	0.09

This table presents descriptive statistics, basic ANOVA, and follow-up simple effect test results for auditor's expected adjustment. All *p-values* are one-tailed.

The dependent variable, Expected Adjustment, is participants' response to the following question (in thousands) "What adjustment to the warranty accrual do you believe will most likely be recorded in the financial statements?" Responses were adjusted for management's proposed estimate of $7,507,500 and thus indicate the auditor's expected adjustment on top of management's estimate.

Support is manipulated by varying the support management provides for their estimate. In the *More* condition, the estimate is based on industry information, inquiry of technicians, review of records, and site inspections, while in the *Less* condition the estimate is based on only industry information and inquiry.

Uncertainty is manipulated by providing information about potential costs to resolve the warranty issue that revealed either *Moderate* uncertainty (between $6.3 million and $8.8 million) or *Extreme* uncertainty (between $2.9 million and $13.4 million).

Table 3
Assurance Provided to Users of the Financial Statements

Panel A: Descriptive statistics for auditor assessment of assurance provided

| | | | *Evidence* | | |
			Less	*More*	Total
Uncertainty	*Extreme*	Mean	3.62	4.38	4.01
		Standard Deviation	1.85	1.90	1.88
		Sample size	19	21	40
	Moderate	Mean	4.99	4.42	4.71
		Standard Deviation	1.85	1.90	1.88
		Sample size	22	22	44
	Total	Mean	4.35	4.40	8.75
		Standard Deviation	1.89	1.93	1.87
		Sample size	41	43	84

Panel B: ANCOVA results

Factor	df	MS	F	*p-value*
Preliminary RMM	1	11.311	3.31	0.07
Evidence	1	0.193	0.06	0.41
Uncertainty	1	10.011	2.93	0.05
Evidence*Uncertainty	1	8.768	2.57	0.06
Residual	77	3.415		

This table presents descriptive statistics and basic ANCOVA results for auditor's perception of the level of assurance provided to users of the financial statements. All *p-values* are one-tailed.

The dependent variable, user assurance, is participants' response to the following question (on an 11-point scale) "What level of assurance are you able to provide over the warranty accrual to users of the financial statements?"

Preliminary RMM is participant's response to the following questions (on an 11-point scale) before they were provided managements analysis or exposed to any manipulations "For planning the year-end test work, how would you assess the risk of material misstatement of the Warranty Accrual?"

Support is manipulated by varying the support management provides for their estimate. In the *More* condition, the estimate is based on industry information, inquiry of technicians, review of records, and site inspections, while in the *Less* condition the estimate is based on only industry information and inquiry.

Uncertainty is manipulated by providing information about potential costs to resolve the warranty issue that revealed either *Moderate* uncertainty (between $6.3 million and $8.8 million) or *Extreme* uncertainty (between $2.9 million and $13.4 million).

Table 4
Robustness Test for Auditor Comfort

Panel A: Descriptive statistics for auditor's comfort with management's estimate

	Pairwise			Listwise		
	A	B	C	D	E	F
	All Observations	Attentive Responses	Attentive and Context	All Observations	Attentive Responses	Attentive and Context
Extreme/More						
Mean	-0.27	-0.27	-0.24	-0.16	-0.16	-0.12
Standard Deviation	1.89	25.00	1.93	1.90	1.90	1.94
Sample size	25	25	24	22	22	21
Extreme/Less						
Mean	-1.54	-1.54	-1.42	-1.49	-1.49	-1.37
Standard Deviation	1.72	1.72	1.77	1.75	1.75	1.80
Sample size	22	22	20	21	21	19
Moderate/More						
Mean	-0.14	-0.14	-0.14	0.03	0.03	0.03
Standard Deviation	2.16	2.16	2.16	2.17	2.17	2.17
Sample size	24	24	24	22	22	22
Moderate/Less						
Mean	0.71	0.75	0.75	0.96	1.01	1.01
Standard Deviation	1.90	1.94	1.94	1.50	1.52	1.52
Sample size	24	23	23	23	22	22
Total						
Mean	-0.28	-0.29	-0.23	-0.14	-0.14	-0.07
Standard Deviation	2.06	2.07	2.07	2.01	2.02	2.02
Sample size	95	94	91	88	87	84

Panel B: ANOVA results

	Pairwise			Listwise		
	A	B	C	D	E	F
	All Observations	Attentive Responses	Attentive and Context	All Observations	Attentive Responses	Attentive and Context
Support						
p-value	0.30	0.32	0.36	0.31	0.33	0.37
std. error	0.40	0.40	0.41	0.39	0.40	0.41
F	0.3	0.2	0.1	0.3	0.2	0.1
Uncertainty						
p-value	0.00	0.00	0.00	0.00	0.00	0.00
std. error	0.40	0.40	0.41	0.39	0.40	0.41
F	9.0	9.1	7.6	11.4	11.5	9.5
Support*Uncertainty						
p-value	0.00	0.00	0.01	0.00	0.00	0.00
std. error	0.20	0.20	0.21	0.20	0.20	0.21
F	7.2	7.2	6.3	8.3	8.5	7.4
Residual						
std. error	0.34	0.34	0.35	0.34	0.34	0.35
F	5.7	5.7	4.7	4.6	4.7	3.7

Table 4 (cont.)
Robustness Test for Auditor Comfort

Panel C: Contrast test results

	Pairwise			Listwise		
	A	B	C	D	E	F
	All Observations	Attentive Responses	Attentive and Context	All Observations	Attentive Responses	Attentive and Context
Support, Uncertainty=Extreme						
p-value	0.01	0.01	0.02	0.01	0.01	0.02
F	5.1	5.0	4.0	5.6	5.6	4.4
Support, Uncertainty=Moderate						
p-value	0.06	0.06	0.06	0.05	0.04	0.04
F	2.4	2.5	2.4	2.9	3.1	3.0

Table 4 presents descriptive statistics, basic ANOVA, and follow-up simple effect test results for auditor comfort with different filters applied to observations. Pairwise includes all observations with completed *comfort variables*, while listwise includes only observations with completed *comfort* and *expected adjustment* variables. Column A and D present results for all observations. Column B and E present results after dropping one observation due to evidence of inattentiveness during the experiment, based the same response to 20 consecutive variables. Column C and F present results after dropping the one inattentive observation and dropping three observations because of perceptions that managements estimate was overly conservative while my hypotheses rely on management's estimate being perceived as reasonable or aggressive. All *p-values* are one-tailed.

The dependent variable, auditor comfort, is the average of two questions designed to illicit participant's overall comfort with management's warranty accrual (both on an 11-point scale). The two questions were (1) "Rate the overall reasonableness of management's $7,507,500 adjustment to the warranty accrual?" and (2) "How comfortable are you with management's adjustment to the warranty accrual?"

Support is manipulated by varying the support management provides for their estimate. In the *More* condition, the estimate is based on industry information, inquiry of technicians, review of records, and site inspections, while in the *Less* condition the estimate is based on only industry information and inquiry.

Uncertainty is manipulated by providing information about potential costs to resolve the warranty issue that revealed either *Moderate* uncertainty (between $6.3 million and $8.8 million) or *Extreme* uncertainty (between $2.9 million and $13.4 million).