Audit Team Distance and Audit Quality Threatening Behaviour

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Abstract:

This paper uses unique survey data from a Swedish Big 4 firm to examine the association between audit quality threatening behavior (AQTB) and two types of distance between team members in audit teams (i.e., audit team distance): subjective distance as the perception of proximity, and communication distance as the percentage of communication via technology. Investigating the factors influencing AQTB is important because AQTB adversely affects audit quality. The results show that team members with greater subjective and communication distance engage in more AQTB, which suggests that audit firms should pay attention to team members' subjective and communication distances and take actions to curb their negative impacts. Using rich data collected from real-world audit team experience, this study deepens our understanding of how different types of audit team distance impact auditors' AQTB.

Keywords: audit quality threatening behavior (AQTB), audit team distance, subjective distance, communication distance

I. INTRODUCTION

Audit team characteristics can significantly affect audit outcomes (e.g., Francis 2011; Knechel, Krishnan, Pevzner, Shefchik, and Velury 2013). The extent and quality of evidence auditors collect and evaluate are essential because their work forms the foundation of the audit opinion (Lambert and Agoglia 2011; Bennett and Hatfield 2013). Because an audit is the coalescence of the audit activities of each team member, audit team members depend on each other's work. Hence, how team members interact can influence their behavior. For example, how team members feel toward each other and how they communicate could influence their tendency to engage in audit quality threatening behavior (AQTB). AQTB refers to actions an auditor takes that can adversely affect the quality of an audit and therefore concerns shareholders and the general capital market (Otley and Pierce 1996; Cullinan 2004; Sweeney and Pierce 2015).

This study examines whether and how the distance between members within the audit team (i.e., audit team distance) is associated with AQTB. Specifically, we analyze two types of distance between team members: subjective distance and communication distance. Subjective distance is the audit team members' psychological perception of proximity (an affect distance), measuring how close team members feel to their fellow team members (Trope and Liberman 2010; Weisner 2015). When team members feel psychologically close (distant), subjective distance is small (large). Communication distance refers to the extent to which communication is conducted via technology rather than face-to-face (Hertel, Konradt, and Orlikowski 2004; Foster, Abbey, Callow, Zu, and Wilbon 2015). The higher the percentage of communication that is conducted through technology, the greater the communication distance, and vice versa.

There has been increasing interest in examining how characteristics of audit teams affect audit outcomes (e.g., Hanes 2013; Downey, Obermire, and Zehms 2020). The disruption caused by the COVID-19 pandemic has dramatically influenced how team members interact and communicate (Wen 2020; Okabe-Miyamoto and Lyubomirsky 2021; Bauer, Humphreys, and Trotman 2022), which could be related to team members' subjective and communication distances. Hence, it is necessary to assess how those distances between audit team members could affect their AQTB.

This study investigates eight commonly documented AQTBs: underreporting time, premature sign-off, biased sample selection, reduction in sample sizes, accepting weak client explanations, over-relying on client documentation, failure to document the work properly, and failure to investigate an accounting principle. AQTB has been documented for several decades (Buchman and Tracy 1982; Otley and Pierce 1996; Coram, Ng, and Woodliff 2004), and because it relates to the audit testing process, it is a key antecedent to audit quality (Hay, Knechel, and Willekens 2015). If audit teams do not properly execute audit steps in the auditing process, evidence-gathering effectiveness will be reduced (Kelley and Margheim 1990).

We focus on AQTB, as opposed to audit quality more generally, because AQTB often arises as a result of interpersonal interactions (Lambert and Agoglia 2011). How team members feel and how they communicate can affect their interactions. When team members feel distant from others and do not communicate well, they may have a negative affect (Wilson, Boyer O'Leary, Metiu, and Jett 2008; Jung 2016), which could influence their performance. Carlisle, Gimbar, and Jenkins (2022) study interactions between auditors and clients and find that difficult communications between auditors and clients could cause avoidance of interactions, which can cause AQTB. Furthermore, how people feel toward each other and how they communicate can also affect their accountability (Dezoort, Harrison, and

Taylor 2006; Hall, Frink, and Buckley 2007; Frink, Hall, Perryman, Ranft, Hochwarter, Ferris, and Royle 2008), and accountability influences auditors' behavior (Downey et al. 2020). Because audit team members' subjective and communication distances can affect their interpersonal interactions, which in turn influence AQTB, this study focuses on auditors' AQTB and examines the association between audit team distance and AQTB.

We develop two hypotheses, one for the association between AQTB and subjective distance (H1) and one for the association between AQTB and communication distance (H2). We expect that audit team members' subjective distance is positively associated with their AQTB because larger subjective distance can lead to poor interpersonal interaction, which results in more AQTB (Lambert and Agoglia 2011). We also predict a positive association between audit team members' AQTB and their communication distance because greater communication distance may negatively affect team members' exchange of information, which may cause misunderstandings and interpersonal conflicts. Because conflicts are associated with negative affect (Bodtker and Jameson 2001; Jung 2016) and accountability (Hall et al. 2007; Frink et al. 2008), greater communication distance can lead to more AQTB.

This study uses unique and proprietary survey data collected from a Big 4 firm in Sweden in 2016, based on auditors' real experience in an audit team. We distributed the questionnaire survey to 776 auditors who worked on 217 teams and received responses from 335 auditors in 185 teams. Hence, the team response rate is 85 percent, and the auditor response rate is 43 percent. The findings show that AQTB has statistically significant and positive associations with subjective and communication distances. These results indicate that team members with larger subjective and communication distances engage in more AQTB.

A unique feature of our data is that we know precisely to which team each auditor or respondent belongs. This feature distinguishes our study from others in the team literature that usually use data on team members from different teams without specifying the link

between them. Because each team audits one specific client, and a team and its client differ from other teams and clients, team and client characteristics could affect audit outcomes. For example, auditors may conduct relatively more AQTB when their clients are more complicated. Furthermore, because some team and client features cannot be observed or measured, regression models will have omitted variables, which could bias the regression results (Mummolo and Peterson 2018; Breuer and deHaan 2021).[1] Knowing the information on the link between auditors and their teams allows us to control for the unique features of each team and the client each team audits by including team fixed effects, which alleviates the impact of omitted variables. Hence, the information on the link between auditor and audit team is important. Note that some of the results differ when we do not control for team fixed effects.[2]

This paper makes several contributions. First, to the best of our knowledge, this study is the first to simultaneously examine team members' subjective (psychological) distance and communication distance that can be experienced in audit teams. Little has been done in the prior literature to examine how audit team members' subjective and communication distances are related to their AQTB. Second, although the prior literature has shown that team distance influences the behavior and performance of workplace teams (Kraut, Fussel, Brennan, and Seigel 2002; Gibson, Cooper, and Conger 2009), it is important to investigate team distance in the audit setting because audit teams and other (non-audit) teams have major differences

[1] While we have tried our best to add some controls related to auditors and clients in the regressions, it is unlikely that we have included all factors that may affect AQTB. Hence, the possibility that there are omitted variables remains.

[2] Including team fixed effects controls for team/client specific characteristics, which allows us to conduct a within-team analysis and to capture the influence of the distance between auditors in the same audit team on their AQTB. The ability to control for team fixed effects is a strength of the study and, in our view, leads to conclusions of greater validity. However, as we discuss further in Section 4, while our finding for H1 is very robust, the coefficient on communication distance is no longer significant when we do not control for fixed effects. Thus, it is important to note that our finding for H2 is dependent on this design choice.

(Hanes 2013; Downey et al. 2020).[3] Third, this paper contributes to the audit team literature by providing new insights on how audit team members' relationships and communication can shape their behavior. How team members perceive each other and communicate could impact their behavior and ultimately impact audit quality.

Finally, this paper offers evidence supporting the notion that team members' subjective and communication distances are harmful to their behavior. As such, audit firms should investigate ways to reduce team members' subjective distance and enhance their communication. This point is particularly relevant for audit practice since the effects of the COVID-19 pandemic have increased communication distance and potentially lead to a rise in the subjective distance experienced by audit teams.

We expect that our findings are generalizable to other countries. This study employs data from a Big 4 firm in Sweden. Ege, Kim, and Wang (2020) show that global audit firm networks enforce consistent audit methodologies across their member firms in different countries. Because the Big 4 firms in Sweden are members of global audit firm networks, the results of this study should be generalizable to other countries, such as the United States.

II. THEORY AND HYPOTHESES DEVELOPMENT

Audit Quality Threatening Behavior (AQTB)

AQTB refers to actions that reduce evidence-gathering effectiveness and compromise audit quality (Malone and Roberts 1996). AQTB is of great concern to the profession because AQTB increases the risk of an inappropriate audit opinion (Coram et al. 2004). Various types of AQTB have been documented, such as accepting weak client explanations (Willett and

[3] Audit teams differ from other (non-audit) teams because audit teams should be independent of their clients, audit firms have a duty to the public, and the audit industry is highly regulated and litigious (Doty 2011; Hanes 2013; Downey et al. 2020).

Page 1996; Coram et al. 2004; Pierce and Sweeney 2004); superficially reviewing client documents (Dalton and Kelley 1997; Pierce and Sweeney 2004); inadequately investigating accounting principles (McNair 1991; Otley and Pierce 1996); inappropriately relying on the client's internal controls (Pierce and Sweeney 2004); premature sign-off of the working papers (i.e., signing off on a required audit step without completing the work or noting the omission of procedures) (Coram et al. 2004); and underreporting audit time (Willett and Page 1996; Pierce and Sweeney 2004).

The above-mentioned AQTB is commonly performed (Smith, Emerson, and Boster 2018), and is still discussed by auditing standards committees (PCAOB 2022). Evidence shows that more than half of auditors admit to engaging in at least one type of AQTB (Donnelly, Quirin, and O'Bryan 2003; Coram et al. 2004; Smith and Emerson 2017). This study examines how subjective and communication distances between audit team members are associated with their AQTB. When team members do not feel close to each other due to greater subjective distance or feel frustrated because of poor communication via technology, they might have negative feelings and feel less accountable, which could impact their behavior. In the following subsections for hypotheses development, we argue that audit team members' subjective and communication distances can be associated with both their affect and accountability, two aspects which in turn impact their behavior (Herda, Cannon, and Young 2019; Downey et al. 2020).

Hypotheses Development

Subjective Distance and AQTB (H1)

Subjective distance is an affective and cognitive psychological distance between team members (Trope and Liberman 2010; Weisner 2015). It is a concept that describes how close team members feel to each other as an emotional experience (Wilson et al. 2008; Trope and Liberman 2010). Team members with a smaller subjective distance feel close to other team

members, while those with a larger subjective distance feel more distant. Below, we discuss how audit team members' feelings toward each other are associated with both their affect and accountability, and how auditors' affect and accountability influence their AQTB.

Subjective distance is perceived proximity and relates to feelings, and for team members with a larger subjective distance, the feeling of being distant from other members can lead to negative affect (Wilson et al. 2008). Affect refers to various feelings, including moods and emotions (Blay, Kadous, and Sawers 2012). Negative affect can cause people to narrow their focus of attention inappropriately or to direct their attention toward task-irrelevant issues, such as worry, anxiety, or oneself as the object of evaluation (Baumeister and Showers 1986; Stone and Kadous 1997). Furthermore, negative affect can harm judgments regarding investment decisions (Kida, Moreno, and Smith 2001; Moreno, Kida, and Smith 2002) and inventory obsolescence assessments (Bhattacharjee and Moreno 2002).

Evidence shows that affective states could impact several aspects of the audit, including risk assessment, brainstorming tasks, and task efficiency (Bhattacharjee and Moreno 2002; Thoresen, Kaplan, Barsky, Warren, and Chermont 2003). Several studies have documented a significant relation between auditor affect and auditor judgment and behavior (Frank and Hoffman 2015; Johnson, Lowe, and Reckers 2016; Andiola, Bedard, and Westermann 2019), where negative affect decreases the quality of judgments and behavior. The experience of emotional affect between auditors and its suggested behavioral outcomes have also been documented in the audit review process where auditors need to interact (Andiola et al. 2019). Moreover, there is direct evidence that auditors' negative affect can cause more AQTB. For example, Lambert and Agoglia (2011) find that frustration is a mediator of the impact of a delayed review on audit workpaper preparers' likelihood of premature sign-off. In addition, Bennet and Hatfield (2013) report that auditors may collect less evidence when they have anxious emotional states. Herda et al. (2019) reveal that auditors' workplace mindfulness,

which is related to one's affective state, impacts their AQTB. Hence, when team members have negative feelings toward other team members due to a large subjective distance, they might engage in AQTB.

While team members' subjective distance is related to their affect, their subjective distance can also be associated with accountability. Accountability could be the most pervasive single influence on human social behavior and refers to accepting and meeting one's personal responsibility (Tetlock 1992), being and feeling obligated to others as well as oneself, and having to justify one's action to others (London 2003). People feeling lower accountability are more likely to act dishonestly (Hall, Zinko, Perryman, and Ferris 2009), and a higher feeling of accountability is positively associated with favorable attitudes and behavior (Hall et al. 2009; Mero, Guidice, and Werner 2014). Furthermore, there is evidence of a positive relationship between accountability and job satisfaction (Thoms et al. 2002; Breaux, Munyon, Hochwarter, and Ferris 2009).

Humans are primarily social creatures and social relationships shape accountability (Painter-Morland 2006; Stewart, Synder, and Kou 2021). Team members with a smaller subjective distance could feel more accountable to their fellow members because of their close relationships (Stewart et al. 2021). The closeness of team members with a smaller subjective distance helps convert individual actions into coordination and collaborative team effort (Meyerson, Weick, and Kramer 1996; Dirks 1999). When teams are held accountable for how they make decisions, they exchange more information (Liu and McLeod 2014), and more often choose the correct alternative (Scholten, van Knippenberg, Nijstad, and De Dreu 2007). This evidence suggests that audit team members with a smaller subjective distance will feel more accountable, and therefore make more efforts to avoid AQTBs such as skipping audit steps or premature sign-off.

Taken together, we expect that auditors with a larger subjective distance will experience negative affect toward other team members and feel less accountable to the team. As a result, audit team members, feeling psychologically more distant from other members, may conduct AQTB more frequently. We therefore predict a positive association between team members' subjective distance and their AQTB in our first hypothesis (H1).

H1: *There is a positive association between subjective distance and AQTB.*

Communication Distance and AQTB (H2)

Communication distance refers to a distance that occurs when team members use technology to transfer information rather than meet face-to-face (Hertel et al. 2004; Foster et al. 2015).[4] When a higher percentage of communication across team members is conducted through technology, we argue that communication distance is greater, and vice versa. This study focuses on the quality of communication (i.e., *how* information is communicated) rather than on the quantity of communication (i.e., *how much* information is communicated). It is argued that the quality of communication is much more important than the quantity of communication for team performance (Marks, Zaccaro, and Mathieu 2000; Marlow et al. 2018).

The prior literature on communication via technology has used terms such as "computer-mediated communication" (CMC) (Baltes, Dickson, Sherman, Bauer, and LaGanke 2002; Shuffler, Wiese, Salas, and Burke 2010; Bennet and Hatfield 2018; Ren 2018). This literature compares CMC with face-to-face communication and argues that CMC is less rich in information, offers fewer opportunities for asking questions, and is more strenuous than face-to-face communication (Shuffler et al. 2010). This reduction in information richness of CMC reduces the effectiveness of communication and increases the

[4] Because team members in different locations must communicate via technology, it is natural that their physical location affects their communication distance. We consider audit team members' physical location in Section 4.

extent to which communication breakdowns and misunderstandings occur (Andres and Shipp 2010).

Baltes et al. (2002) conduct a meta-analysis of research by comparing decision-making in face-to-face groups versus CMC groups. They show that CMC leads to decreases in group effectiveness, increases in the time required to finish tasks, and decreases in member satisfaction, as compared to what occurs in face-to-face groups. These consequences driven by the use of technology could cause conflicts and negative feelings among group members. Negative feelings are experienced during conflicts (Jung 2016) and all conflict is to some degree emotional (Bodtker and Jameson 2001). Hence, a greater communication distance could cause negative affect due to misunderstandings and conflicts, and could thus result in AQTB (Lambert and Agoglia 2011).

In addition to the negative affect communication distance causes on team members, the greater use of technology to communicate may also influence auditors' accountability, because characteristics of the decision environment can impact how accountable individuals feel (Hall et al. 2007; Frink et al. 2008). For example, face-to-face versus electronic reviews can influence preparers' accountability perceptions (Kreitner and Kinicki 2001). Brazel, Agoglia, and Hatfield (2004) find that auditors anticipating electronic review, compared with those anticipating face-to-face review, are less concerned about audit effectiveness and feel less accountable for their work. When individuals feel more accountable to others, they may place greater emphasis on accuracy and use more time and cognitive effort to process information (Kennedy 1993), which are likely to result in less AQTB.

As discussed in the previous subsection, auditors with negative affect and less accountability are more likely to engage in AQTB. Thus, we predict that team members with a greater communication distance may conduct more AQTB because a greater

communication distance could cause audit team members to have negative affect and feel less accountability. We formulate our second hypothesis as follows:

H2: *There is a positive association between communication distance and AQTB.*

III. RESEARCH DESIGN

Proprietary Data and Survey Participants

We obtained data from a Big 4 firm in Sweden. The Big 4 firm first provided us with a data set that contained 909 audit teams for 909 relatively large engagements,[5] which the audit firm had conducted for the whole audit cycle between July 2015 and June 2016. This data set contains information such as team index ID, auditor ID, auditor rank, and the number of audit hours for *each team member* in the 909 teams. Each auditor could be involved in more than one audit team. In this data set, there are in total 1,512 unique auditors, and all the auditors are classified into one of the multiple ranks (e.g., partner, manager, and associate). The audit firm also provided information about some characteristics of the engagement clients, for example, total assets, sales, leverage, and performance.

This data set of team members in audit teams acts as a starting point from which we obtained our survey participants. When considering the survey participants, we set several criteria to increase the quality of the survey responses. First, we required auditors to answer the questionnaire only once, although one auditor could be involved in more than one audit team during an audit cycle. Second, we required responses from auditors of different ranks in an audit team (e.g., partner, associate, and manager) to increase the possibility of diverse perspectives of the audit team experience. Third, when an auditor appeared on more than one team, we used the team for which the auditor had the greatest number of hours. We used the team Index ID and auditor ID to match the survey respondents and the information in the data

[5] There are on average 19 team members per team in this data set.

set provided by the audit firm. For example, the participants were given the specific code of the engagement/client that they had worked on during the period so that the participants could understand which client/team to consider while taking part in our survey. Out of the 1,512 unique auditors in the various ranks, we sent the questionnaire to 776 auditors who worked on 217 teams.

Questionnaire Design and Collection Procedure

The questionnaire is inspired by the experiential questionnaire design (Gibbins and Qu 2005). This design helps participants think about the engagement experience by first asking them about specific details to induce thoughts about who was involved, and about what, where, how, why, and when different aspects occurred, questions which can reduce memory bias. Further questions are then asked about the major concepts used in the research.[6] Following P. Podsakoff, MacKenzie, Lee, and N. Podsakoff (2003), the questionnaire uses common, simple language to decrease uncertainty about the questions' meaning. Finally, it adopts scale items already used and tested in previous research (the scale items are described in more detail below).[7]

Two rounds of pilot tests were conducted before the collection of survey data. Similar questions were used in both pilot tests. The first pilot test of the questionnaire was conducted at three different audit firms during previous research. The second pilot test was conducted via an Internet service using five randomly sampled teams chosen from the 909 engagements of the Big 4 audit firm. It was conducted during five working days and was sent to 44 participants. Seventeen responses were collected, a 39 percent response rate. The pilot tests helped refine the questions, validating their use in the audit context and in team-level measurement.

[6] The questionnaire was designed for use on multiple projects. See Appendix A for the survey questions related to this study.

[7] We have obtained IRB (Institutional Review Board) exemption from the university, since the survey does not provide sensitive information defined in Sweden under the Act (2003: 460).

Before the questionnaire was distributed, the partners at the Big 4 firm sent an email to the participants to inform them about the research and the questionnaire and to encourage survey participation (Jones III, Norman, and Wier 2010).[8] The researchers then distributed the questionnaire online. An online survey instrument can reduce bias caused by issues related to researcher–respondent contact (Jones III et al. 2010). The questionnaire starts with a letter from the researchers informing participants about confidentiality and anonymity (Gibbins 2001; Nelson, Elliott, and Tarpley 2002).

Responses and Sample

We received responses from 335 team members in 185 teams. The individual response rate was 43 percent (= 335/776), and the team response rate was 85 percent (= 185/217). We analyzed non-responses by using ANOVA to compare differences between the first 50 and last 50 responses (Fogarty and Kalbers 2000), which gave a probable direction of any non-response bias. Non-response bias is the possibility that respondents who did not answer the questionnaire would systematically respond differently from those who did answer the questionnaire; thus, the information given may be biased (Fogarty and Kalbers 2000). We reduced non-response and personal bias through the questionnaire design (Gibbins and Qu 2005). The results show no significant difference between early and late responses, which indicates a low risk for non-response bias.

Key Variable Measurements and Tests of Data Credibility

Following the literature (e.g., Otley and Pierce 1996; Sweeney, Pierce, and Arnold 2013), we measure AQTB by asking participants their perceptions of how team members behaved. We use eight questions, which are commonly discussed in the audit literature (Kelley and Margheim 1990; Donnelly et al. 2003; Sweeney and Pierce 2015; Smith et al.

[8] The questionnaire was written in English, which the audit firm deemed appropriate because the business language of the audit firm was English, and all employees had an excellent command of the English language.

2018). We measure the individual team member's perception of the frequency of the AQTB that their team members performed, using a scale of 1 (Never) to 5 (Always).

The eight questions used to measure AQTB are 1) reduce the amount of work performed on an audit step below what you consider reasonable; 2) underreport audit time; 3) sign off an audit program step without completing the work or without noting the omission; 4) make an unauthorized reduction of sample size; 5) have a greater than appropriate reliance on client work; 6) accept weak client explanations; 7) make superficial reviews of client documents; and 8) fail to investigate an accounting principle.

Certain statistical tests are commonly used to address the validity and reliability of Likert-type scale measures, such as Cronbach's alpha and factor analysis. We follow the literature to check data reliability and validity for our AQTB measures (Malone and Roberts 1996; Pierce and Sweeney 2010; Sweeney, Arnold, and Pierce 2010; Yuen, Law, Lu, and Guan 2013; Johansen and Christoffersen 2017). A scale is reliable if there is internal consistency, and the most common measure of internal consistency is Cronbach's alpha (Cronbach 1951). A Cronbach's alpha value of 0.7 or greater generally indicates good internal consistency (Bollen and Lennox 1991; Clark and Watson 1995; Hulin, Cudeck, Netemeyer, Dillon, McDonald, and Bearden 2001). Our test shows that the Cronbach's alpha for our AQTB measure's internal consistency is 0.83, which is greater than 0.7 and indicates good reliability.

The Kaiser–Meyer–Olkin (KMO) test measures sampling adequacy and is a statistic that indicates the proportion of variance in the variables that underlying factors might cause. The KMO test returns a value between 0 and 1, and a high value generally suggests that factor analysis may be useful for the data. A rule of thumb for interpreting the statistic is that KMO values between 0.8 and 1 indicate adequate sampling. The KMO test for our AQTB gives a value of 0.89, which is high and signals good convergent validity (Bagozzi and

Youjae 1988). Factor analysis shows that these eight AQTBs load on one factor. Factor loadings are greater than 0.50 for each behavior, which is considered ideal (Hair, Black, Babin, and Anderson 2010). Altogether, the tests indicate good validity and reliability, which allows for further tests of the hypotheses using the models specified below.

We construct two aggregated measures of AQTB based on the eight individual AQTBs. Following previous studies (Otley and Pierce 1996; Svanberg and Öhman 2013), we calculate the average of the eight AQTB measures, *MeanAQTB*, to measure the aggregated perception of AQTB for each respondent/team member and to test our hypotheses. *MeanAQTB* assigns equal weight to the eight measures. The other measure is based on the weights from the factor analysis (see Section 4). All variable definitions are provided in Appendix B.

Subjective distance (*SubDis*) captures how close an auditor feels to the other members of the team. We measure *SubDis* using a single-item pictorial measure intended to directly tap people's sense of interpersonal interconnectedness (Aron, Aron, and Smollan 1992). The survey question for measuring *SubDis* is "*Select the number that corresponds to the picture that most closely matches your relationship with the other audit team members.*" The respondents select the picture that best describes their relationship from a set of Venn-like diagrams, each representing different degrees of overlap of two circles (see question #4 in Appendix A).[9] *SubDis* is measured on a scale of 1 to 7, where 1 indicates the largest subjective distance and 7 the smallest. Since a high response score indicates a small subjective distance, we reverse the scores by switching 1 and 7, 2 and 6, and 3 and 5 so that a higher score indicates a larger subjective distance. The variable *SubDis* is our test variable for H1.

[9] This pictorial measure of Aron et al. (1992) has also been used to represent in-group versus out-group measures (e.g., Coats, Smith, Claypool, and Banner 2000; Schubert and Otten 2002).

Communication distance captures the extent of communication through technology instead of face-to-face. The survey question is taken from Siebdrat, Hoegl, and Ernst (2014) and measures the percentage of communication that takes place via phone, email, teleconferencing, and other technology tools (see question #5 in Appendix A). The question is: *To what percent has team communication been channeled through 1) the phone, 2) email, 3) teleconferencing (e.g., Skype), and 4) other virtual tools?* For each respondent, we compute the sum of responses to each sub-question, *SumComDis*, and use it to measure our construct of team members' communication distance. *SumComDis* has a value between 0 and 100 percent. The variable, *SumComDis*, represents how much communication with other team members was conducted via technology. For example, if a team member communicates with other members using technology only, *SumComDis* would be 100 percent; and *SumComDis* would be 60 percent if the team member's communication with other members is about 60 percent via technology and about 40 percent face-to-face. To make the communication distance measure follow the Likert-type scale as the subjective distance measure, we have converted the percentage into a scale between 1 and 10 such that 1 refers to a percentage between 0 and 10 percent while 10 refers to a percentage between 90 and 100 percent. Therefore, our communication distance construct was measured on a scale of 1 (10 percent) to 10 (100 percent). The communication distance captures the percentage of communication via technology, which is more about the quality (i.e., how information is communicated) rather than about the quantity of communication (e.g., how much information is communicated). *SumComDis* is our test variable for H2.

Models and Control Variables

We examine the relationship between the dependent variable, *MeanAQTB*, and the two test variables that measure audit team distance: subjective distance (*SubDis*) and communication distance (*SumComDis*), respectively, in equations (1) and (2). After testing

each of the hypotheses separately, we include both test variables in the same regression in equation (3). Since AQTB is an ordered categorical variable scored on a Likert-type scale, we use ordered logistic regression (OLOGIT) to perform the analyses.[10] The control variables (*Controls*) will be discussed below.

Because there are many possible omitted variables related to teams and clients, and fixed effects are ubiquitous in financial economics as a control for correlated omitted variables (Breuer and deHaan 2021), we include fixed effects on audit teams (*FEteam*) to control for the impacts of unobservable variables related to teams and clients. Including team fixed effects allows us to focus on the association between distance among team members and their AQTB within each team. This is important for our setting because, although we have controlled for auditor- and client-related variables, other unobservable factors that relate to the audit team (e.g., the ethical tone) or the client (e.g., the controller's receptiveness to information requests) may affect the general level of AQTB on a particular engagement.[11]

Because observations with only one team member in the team will be excluded due to the inclusion of team fixed effects, we use in our main analyses only observations where at least two team members have responded to the survey. Put differently, we exclude observations of single team members. The resulting sample contains 251 team members in 101 audit teams.

$$MeanAQTB = \beta_0 + \beta_1\, SubDis + Controls + FEteam + \varepsilon \quad (1)$$

$$MeanAQTB = \beta_0 + \beta_2\, SumComDis + Controls + FEteam + \varepsilon \quad (2)$$

$$MeanAQTB = \beta_0 + \beta_1\, SubDis + \beta_2\, SumComDis + Controls + FEteam + \varepsilon \quad (3)$$

[10] Whether to use OLOGIT or ordinary least squares (OLS) regression is the subject of debate within applied econometrics. OLS is usually applied for continuous variables. The advantage of OLOGIT is that it considers the different distances between each category, which is relevant in our case because both the dependent and the test variables use ordered categorical Likert-type scales. Hence, in our view, OLOGIT is preferred for our analyses. Nevertheless, we also use OLS for the robustness tests below.

[11] We are not aware of any studies that use team fixed effects, probably because the data on the link between team members and teams, i.e., which team member belongs to which team, are rarely available. However, it is very common to use fixed effects to control for omitted variables (e.g., England, Farkas, Kilbourne, and Dou 1988; Mummolo and Peterson 2018; Breuer and deHaan 2021).

A positive (negative) coefficient on β_1 and β_2 indicates a positive (negative) association between team members' subjective and communication distances, respectively, and AQTB.

We include several control variables (*Controls*) related to the characteristics of team members and their clients, following the literature (e.g., Otley and Pierce 1996; Yuen et al. 2013; Johansen and Christoffersen 2017). Torre and Rallet (2005) argue that individuals' judgments could be related to their characteristics, such as age and gender. Hence, we include the natural logarithm of auditor age (*LnAge*), gender (*Female*) (which is 1 if the member is female and 0 otherwise), and the natural logarithm of the number of years the team member has worked on the engagement (*LnYrExpEngagement*). Because audit team members have different roles and because a hierarchy in an audit team can induce different social equality relations among audit team members (Bamber 1983; Rudolph and Welker 1998), we control for the team role of the member (*TeamRole*). *TeamRole* is scaled between 1 and 7, where 1 indicates the highest role in the hierarchy of the team and 7 refers to the lowest role in the hierarchy. Finally, because the number of hours each auditor spent (*HourSpent*) on the engagement may affect AQTB, we include the natural logarithm of *HourSpent* (*LnHourSpent*).

Client characteristics include size, measured by the natural logarithm of total assets (*LnTA*); performance, measured by returns on assets (*ROA*); leverage, which is the ratio of debt to total assets (*Leverage*); and the number of years the audit client has been registered as a client in the audit firm's system (*Tenure*). We also control for inventory, scaled by total assets (*InvenTAratio*) and sales growth (*SalesGrowth*).

Descriptive Statistics and Correlation Matrix

The descriptive statistics of the dependent variable, test variables, and control variables for the main analyses are reported in Panel A of Table 1. We report the mean, standard deviation (SD), and the 5^{th}, 25^{th}, 50^{th}, 75^{th}, and 95^{th} percentiles. The mean value of

MeanAQTB is 1.93, and the standard deviation is 0.55, on a scale of 1 (never engage in AQTB) to 5 (always engage in AQTB). The mean value of subjective distance (*SubDis*) is 3.22, with a standard deviation of 1.34, on a scale of 1 (smallest subjective distance) to 7 (largest subjective distance). The communication distance (*SumComDis*) is 8.25, with a standard deviation of 2.6, on a scale of 1 (smallest communication distance) to 10 (largest communication distance).

The subsequent rows report descriptive statistics of team members' characteristics. The average age (*Age*) of team members is 36.25 years old, and 44 percent of the auditors are female (*Female*). The mean value of *TeamRole* is 2.5, which indicates that the average participants' role on the team was in the manager (2.0) to senior associate (3.0) range.[12] The number of years of experience in the specific engagement (*YrExpEngagement*) has a mean of 4.67, with a standard deviation of 5.47. The average of hours each auditor spent (*HourSpent*) is 170.69, and the mean of *LnHourSpent* is 4.89.

The statistics on client characteristics illustrate that the average total assets (*TotalAssets*) are 7,736 million SEK (mSEK).[13] The average return on assets (*ROA*) is 0.04, with a high value of standard deviation, 0.18, suggesting a wide range of performance across clients. The mean debt ratio (*Leverage*) is 59 percent and the average number of years the clients have been registered as clients in the audit firm's system (*Tenure*) is 12.84. Inventory

[12] The variable *TeamRole* takes values from 1 to 7, where 1 = Auditor In Charge, 2 = Audit Manager, 3 = Senior Assistant/Associate, 4 = Junior Assistant/Associate, 5 = Tax Specialist, 6 = VAT Specialist, and 7 = Other Specialist. Auditor In Charge refers to the auditor who is responsible for the entire audit and will sign off on the audit report (Zerni 2012; Sundgren and Sandström 2014). While the variable *TeamRole* is not a traditional continuous variable, it generally follows a hierarchy of how much engagement-specific responsibility the auditor has. To examine whether there could be different impacts of auditors in different roles, we construct the following variables based on *TeamRole*: *AuditorInCharge* = 1 if *TeamRole* = 1 and 0 otherwise; *AuditManager* = 1 if *TeamRole* = 2 and 0 otherwise; Associate = 1 if *TeamRole* = 3 or 4 and 0 otherwise; *Specialist* = 1 if *TeamRole* = 5, 6, or 7 and 0 otherwise. We replaced *TeamRole* with different combinations of these indicator variables and find that the main results remain and the coefficients for all of these variables are insignificant. These results are untabulated for brevity.

[13] 1 USD = 8.46 SEK on January 1, 2016.

scaled by total assets (*InvenTAratio*) has a mean of 0.07, and the average sales growth (*SalesGrowth*) is 0.15.

The correlations among the dependent variable, test variables, and control variables used in the main analysis are reported in Panel B of Table 1. *MeanAQTB* is positively and significantly correlated with *SubDis*, with a correlation of 25 percent, and positively correlated with *SumComDis*, with a correlation of 9 percent. The correlation between subjective and communication distances is 6 percent. All correlation coefficients are, in general, low.

IV. RESULTS

To examine the associations between AQTB and the two types of distance between team members in audit teams, we first present the results for the main analyses of H1 and H2, and then the results for the robustness tests. These analyses are at the auditor or team member levels. Finally, we conduct analyses at the audit team level to examine whether teams with greater distance are associated with more AQTB.

Main Results for H1 and H2

The main results for H1 and H2 using *MeanAQTB* as the dependent variable are reported in Table 2. The first two columns display the results for each of the two hypotheses, respectively, and the last column presents the results for both hypotheses simultaneously.[14] The p-values are reported in parentheses in the row below the coefficients.

The results in column (1) for H1 show that the coefficient on *SubDis* is 0.724, which is statistically significant at the one percent level. This finding suggests that subjective distance is positively associated with AQTB, consistent with H1. In column (2), which presents the results for H2, the coefficient on *SumComDis* is 0.120, which is also statistically

[14] The untabulated results show that the variance inflation factors are less than 2 for all the variables, indicating that there is no significant multi-collinearity.

significant at the one percent level. Hence, there is a positive association between communication distance and AQTB as well, supporting H2. For the results in column (3) when both types of team distance are included in the model, the coefficients on *SubDis* and *SumComDis* are 0.714 and 0.112, respectively, and both are statistically significant, consistent with the results in the first two columns.

While it is important to include team fixed effects to control for omitted variables, we have also conducted analyses without including team fixed effects. The results for regressions without including team fixed effects show that the coefficient on subjective distance is still positive and statistically significant at the one percent level. However, while the coefficient on communication distance is still positive, it becomes insignificant. Thus, it is important to note that our result for communication distance is sensitive to the design choice of controlling for team fixed effects.

The results presented in Table 2 suggest that team members who have a greater subjective distance—in other words, team members who feel distant from other members—may engage in more AQTB. The positive and significant coefficient on *SumComDis* suggests that team members with a higher percentage of communication via technology conduct AQTB more frequently. These results indicate that audit firms should pay attention to the subjective distance and the higher percentage of communication via technology among team members.

For the control variables related to auditors, the coefficients on the variables *LnYrExpEngagement* and *LnHourSpent* are positive and statistically significant at the 5 and 10 percent levels in the first and last columns, respectively, suggesting that audit team members who have more experience and spend more time on the engagement are more likely to engage in AQTB. For the control variables related to clients, the coefficient on *LnTA* is statistically significant for all four columns, indicating that larger clients are associated with

more AQTB. Coefficients on the other control variables are statistically insignificant. The pseudo R^2 is between 11 and 14 percent for all the models.

Robustness Tests Using the OLS Model

The main results reported in Table 2 are based on the OLOGIT regression model. We also use the OLS model to check whether our results are robust. The results based on OLS for H1 and H2 are reported in Table 3, which has the same structure as Table 2. The results show that the coefficients on both *SubDis* and *SumComDis* are positive and statistically significant, consistent with those reported in Table 2. The findings in Table 3 indicate that the results are robust to the different regression models.

Robustness Tests Using an Alternative Measure of AQTB

So far, we have used the mean of the eight AQTBs as the dependent variable. Because the factor analysis shows that the eight AQTBs are the same construct, we use the weights from the factor analysis to construct an aggregated AQTB (*AggAQTB*) as an alternative measure. We test H1 and H2 using this new measure and report the results in Table 4.

The first two columns report the results when regressing *AggAQTB* on the test variables separately. The coefficient on *SubDis* is positive and significant at the 1 percent level, with a coefficient of 0.709 and a p-value less than 0.01. The coefficient on *SumComDis* is also positive and significant at the 1 percent level (coefficient = 0.109, p = 0.02). The last column presents the results for both test variables simultaneously. The coefficients on *SubDis* and *SumComDis* are positive and statistically significant, consistent with previous findings. Hence, the results hold when we use a different measure for AQTB.

Additional Analyses Considering Auditors' Physical Location

If one audit team member is located far away from other team members, then it is natural that this auditor has to rely on technology to communicate with others. Hence, where the audit team members are physically located could affect their communication distance. To

address this issue, we consider the physical location of audit team members. Specifically, we use the data on audit team members' audit offices. Not all audit team members are located in the local audit office, where the client holds the contract with the audit firm.[15] We define a dummy variable, *PhyDisDummy*, as equal to 1 for a team member not located in the local audit office and 0 for a team member located in the local audit office.[16] We also use the continuous variable to measure physical distance (i.e., *LnPhyDis*), which is the natural logarithm of the geographical distance in kilometers between the audit offices of the team members and the local audit office. For brevity, we report the results using only *PhyDisDummy* because the regression analyses using *LnPhyDis* provide similar results.

We redo the analysis of model (3), and the only difference is that we add the control variable, *PhyDisDummy*. We first regress *MeanAQTB* on *SubDis*, *SumComDis*, *PhyDisDummy*, and the control variables using OLOGIT and OLS, respectively. The results are presented in the first two columns of Table 5. We then use *AggAQTB* as the dependent variable, and then regress AggAQTB on *SubDis*, *SumComDis*, *PhyDisDummy*, and the control variables based on OLOGIT and OLS, respectively. These results are reported in the last two columns of Table 5.

All four columns in Table 5 show that the coefficients on *SubDis* and *SumComDis* are both positive and statistically significant, consistent with the main findings. The coefficients on *PhyDisDummy* are statistically insignificant. These results suggest that our results are not affected by the physical location of audit team members.

Analysis at the Team Level

In the tests we have conducted thus far, the analyses are at the auditor level. That is, we examine the relationships between distance among team members and their AQTB within each

[15] The local audit office is not necessarily the headquarter for the audit firm but represents which local office contracts with the client.

[16] The indicator variable of physical distance, *PhyDisDummy*, has a mean of 0.33, which indicates that 33 percent of team members or respondents in our sample are not located in the local audit office.

audit team. In this subsection, we conduct the analyses at the audit team level; that is, there is only one observation for each team. Specifically, we investigate whether teams with greater team distance may have more AQTB. We note that we will lose important information when we aggregate team members' observations to the team level.[17] Thus, we expect less power in our analyses at the audit team level than in our previous analyses.

First, for each team, we aggregate each variable across all the team members or respondents in each team and compute the mean.[18] We obtain the key variables at the team level: *AQTB_Team, SubDis_Team,* and *ComDis_Team*. We then regress *AQTB_Team* on the two types of distance at the team level (*SubDis_Team* and *ComDis_Team*) and control for the characteristics of the clients. The results are presented in the first column of Table 6. The coefficient on the subjective distance at the team level *SubDis_Team* is positive and significant at the one percent level, indicating that teams with members feeling closer to each other engage in less AQTB, while those with members who feel more distant engage in more of such behavior. While the result of testing the relation between subjective distance and AQTB at the team level (between teams) is consistent with results in the main tests, the coefficient on communication distance (*ComDis_Team*) becomes insignificant.

Second, smaller audit teams with fewer team members may find it easier to interact or share information than larger audit teams, and therefore smaller teams may engage in less AQTB. We generate a new variable, *LargeTeam,* which is equal to 1 if the number of team members is higher than the median and 0 otherwise. Because team size is positively related to client size, we exclude the measure of client size, *LnTA.* The results, reported in the second

[17] For example, assume that team A contains values of 1, 4, and 7 for *SubDis* of their three team members, and team B contains values of 3, 4, and 5. While both teams have a mean of 4 when aggregating auditors' information to the team level, the individual numbers for the two teams are very different. The aggregated value (the mean) has lost the rich information available at the auditor level.

[18] Following the main analyses, we require teams with at least two team members to be included in this analysis to capture more information. There are 101 teams/observations.

column of Table 6, show that the coefficient on *LargeTeam* is positive and significant, suggesting that larger teams are associated with more AQTB.

V. CONCLUSION

Although much research in team literature has been done on team performance and behavior, studies that use *actual audit* engagement teams have been relatively limited. Using survey data from team members' real experience in audit teams, this paper investigates the association between two types of audit team distance (i.e., subjective distance and communication distance) and AQTB. The findings show that audit team members who feel more distant from other team members and have a higher percentage of communication through technology engage in more AQTB.

This research should be interpreted with caution. First, we note that this study is correlational because it focuses on the association between audit team distance and AQTB, and readers should be circumspect about causality inferences. Second, we acknowledge the limitation of our survey data because they contain only a few team members from each team that responded to the survey. Furthermore, while the finding for the association between AQTB and subjective distance is very robust to all the additional tests, the results for communication distance can vary. When we do not use team fixed effects in the regressions or when we examine the associations at the team level instead of at the auditor level, the association between communication distance and AQTB becomes insignificant. Third, the survey data were collected before the occurrence of the COVID-19 pandemic. While collecting these data pre-pandemic is a strength because responses during this unprecedented time would have been atypical and likely to change over time as people find equilibrium and the situation normalizes, it is also a limitation because the answers might be different now given that more people have now experienced greater distance because of the pandemic. It would be interesting to discover how these findings hold up in the post-pandemic world, and

we call for future research to further explore the association between team distance and AQTB.

This study contributes to auditing research by revealing how subjective and communication distances among team members can influence their behavior. The COVID-19 pandemic has created a work-life scenario that has the potential to increase both communication distance and subjective distance (Bauer et al. 2022). Furthermore, because access to client evidence is restricted and the use of a variety of technologies has increased during the pandemic, audit quality is likely to be affected (Appelbaum, Budnik, and Vasarhelyi 2020). Hence, it is particularly important to understand how the distance between audit team members could affect their behavior. Moreover, this research can contribute to practice and to regulatory boards' knowledge about audit team behavior. Our findings are useful in encouraging audit firms to pay attention to auditors' affective distance and technology-based communication to curb any negative impact on audit outcomes.

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Appendix A

Questionnaire

Dear Participant,

The purpose of this survey is to collect data on auditors' experience with audit teams. We conduct research at our institution and hope to learn from your expertise. The questions are based on previous research about team roles, communication, motivation, competence, well-being, as well as the quality of teamwork and the aim is to investigate whether this research holds true for audit teamwork. We would be grateful if you could answer a few questions about your experience of the specified audit team engagement in 2015, which should take about 20–30 minutes. The information you give us will help us to better understand what an audit team experiences and how the audit team works. The data we collect could help develop knowledge about how to improve team experiences and future staff training and thus the quality of the audit. Information about which audit team factors influence audit quality can also be used as a signal to attract or retain clients, for internal and external standards and regulations, to the shareholders and other external stakeholders. We hope to publish the results in the best audit/accounting journals. Your answers will be kept completely anonymous and therefore confidential.

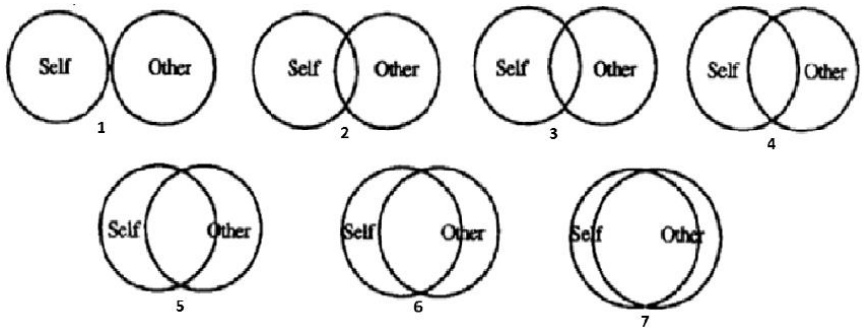
Thank you for participating in our survey. Your feedback is important.

1. Please write the ID number of the engagement client that you have been assigned to for this survey about the audit team for the audit of the fiscal year of 2015 (audit period 07/2015–06/2016).

2. What role did you have in the specified audit team engagement?

3. How many years have you worked on this specific audit team engagement?

4. Look at the picture and answer the question below. Select the number that corresponds to the picture that most closely matches your relationship with the other audit team members.



○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

5. To which percentage has team communication been channeled through
    a. The phone?
    b. Email?
    c. Teleconferencing?
    d. Other virtual tools?

6. Previous research that has studied auditors' behavior has found that there are several different types of behaviors that occur during an audit. From 1 (Never) to 5 (Always), please indicate how often the audit team members of the specified audit engagement conducted the behavior listed below.

    a) Reduce the amount of work performed on an audit step below what you consider reasonable
    b) Underreport audit time
    c) Sign off an audit-program step without completing the work or noting the omission
    d) Make an unauthorised reduction of sample size
    e) Have a greater than appropriate reliance on client work
    f) Accept weak client explanations
    g) Make superficial reviews of client documents
    h) Fail to investigate an accounting principle

7. What is your gender?
8. How old are you?
9. What position do you have at the audit firm?
10. What town is your audit office placed?
11. How many years have you worked in the audit profession?
12. What is the highest level of education you have completed?

Appendix B

Variable definitions

MeanAQTB	=	The average value of the responses to the eight questions about AQTB. The eight measures of AQTB are 1) Reduce the amount of work performed on an audit step below what you consider reasonable; 2) Underreport audit time; 3) Sign off an audit program step without completing the work or without noting the omission; 4) Make an unauthorized reduction of sample size; 5) Have a greater than appropriate reliance on client work; 6) Accept weak client explanations; 7) Make superficial reviews of client documents; and 8) Fail to investigate an accounting principle.
AggAQTB	=	The aggregated AQTB constructed from the eight AQTB measures based on the factor analysis.
SubDis	=	Subjective distance, which is the psychological perception of how close one is to other team members. It is measured by the item: *Select the number that corresponds to the picture that most closely matches your relationship with the other audit team members.*
SumComDis	=	Communication distance, which is the percentage of communication via technology. It is measured by the question: *To what percent has team communication been channeled through 1) the phone, 2) email, 3) teleconferencing (e.g., Skype), and 4) other virtual tools?* We have converted the percentages into a scale between 1 and 10, where 1 refers to 10 percent and 10 refers to 100 percent. *SumComDis* is the sum of the four response values. Our communication distance construct was therefore measured on a scale of 1 (10 percent) to 10 (100 percent).
PhyDisDummy	=	A dummy variable for physical distance. *PhyDisDummy* equals 1 for a team member not located in the main audit office and 0 for a team member located in the main audit office.
SubDis_Team	=	The average subjective distance (*SubDis*) between the team members at the team level.
ComDis_Team	=	The average communication distance (*SumComDis*) between the team members at the team level.
PhyDis_Team	=	The average value of physical distance (*PhyDisDummy*) at the team level.
LnAge	=	The natural logarithm of a team member's age.
Female	=	1 if a team member is female and 0 otherwise.
TeamRole	=	The role of the team member in the team. *TeamRole* is scaled between 1 and 7, where 1 indicates the highest role in the hierarchy of the team and 7 refers to the lowest role in the hierarchy.
LnYrExpEngagement	=	The natural logarithm of the number of years a team member has worked on the specific engagement.
HourSpent	=	The number of hours each team member or respondent spent on the engagement.

LnHourSpent	=	The natural logarithm of the number of hours each team member or respondent spent (*HourSpent*) on the engagement.
LnTA	=	The natural logarithm of total assets of the audit client.
ROA	=	The return on assets of the audit client.
Leverage	=	The leverage ratio of the client, which is the ratio of total debt to total assets.
Tenure	=	The number of years the audit client has been registered as a client at the audit firm.
InvenTAratio	=	The ratio of inventory to total assets.
SalesGrowth	=	The sales growth.
LargeTeam	=	1 if the team size (i.e., the number of team members) is above the median and 0 otherwise.

TABLE 1

Descriptive statistics and correlation matrix

Panel A: Descriptive statistics for the sample of main analyses

	N	Mean	SD	p5	p25	p50	p75	p95
MeanAQTB	251	1.93	0.55	1	1.5	2	2.13	3
SubDis	251	3.22	1.34	1	2	3	4	6
SumComDis	251	8.25	2.6	3	8	10	10	10
Age	251	36.25	8.17	26	29	36	41	53
LnAge	251	3.57	0.22	3.26	3.37	3.58	3.71	3.97
Female	251	0.44	0.5	0	0	0	1	1
TeamRole	251	2.5	1.12	1	2	2	3	5
YrExpEngagement	251	4.67	5.47	1	2	3	5	15
LnYrExpEngagement	251	1.48	0.67	0.69	1.1	1.39	1.79	2.77
HourSpent	251	170.69	143.72	44	82	143	200	429
LnHourSpent	251	4.89	0.74	3.81	4.42	4.97	5.3	6.06
TotalAssets (mNOK)	251	7736	14910	53	317	1527	6881	44548
LnTA	251	14.19	2.01	10.89	12.67	14.24	15.74	17.61
ROA	251	0.04	0.18	-0.18	0	0.04	0.1	0.27
Leverage	251	0.59	0.25	0.09	0.42	0.65	0.77	0.95
Tenure	251	12.84	4.95	4	9	13	17	19
InvenTAratio	251	0.07	0.13	0	0	0	0.11	0.31
SalesGrowth	251	0.15	1.02	-0.26	0	0.02	0.12	0.47

Panel B: Correlation matrix of the dependent variable, test variables, and control variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	*MeanAQTB*	1													
2	*SubDis*	0.25***	1												
3	*SumComDis*	0.09**	0.06	1											
4	*LnAge*	-0.08	-0.15**	-0.06	1										
5	*Female*	-0.13**	-0.16**	-0.03	-0.13**	1									
6	*TeamRole*	-0.02	0.15**	0.06	-0.32***	0.03	1								
7	*LnYrExpEngagement*	-0.09	-0.15**	-0.14**	0.32***	-0.11**	-0.23***	1							
8	*LnHourSpent*	0.02	-0.14**	0.02	-0.21***	0.04	-0.03	0.05	1						
9	*LnTA*	0.13**	-0.10**	0.04	-0.03	-0.09	0.05	0.03	0.34***	1					
10	*ROA*	-0.06	0.03	0.01	-0.04	-0.05	-0.02	0.03	0.04	0.02	1				
11	*Leverage*	0.01	0.02	0.14**	0.00	0.02	0.04	0.08	0.04	0.29***	-0.03	1			
12	*Tenure*	-0.06	-0.07	-0.05	0.03	0.02	-0.05	0.20#	0.06	0.19***	0.05	0.20***	1		
13	*InvenTAratio*	-0.04	-0.05	-0.02	0.07	0	-0.09	0.09	-0.13**	-0.11**	0.04	0.28***	0.17***	1	
14	*SalesGrowth*	-0.08	0.07	-0.05	-0.06	-0.1	0.01	-0.06	0.06	-0.11**	0.1	-0.12**	-0.14**	-0.07	1

Panel A presents the mean (Mean), standard deviation (SD), and the 5th, 25th, 50th, 75th, and 95th percentiles of all the variables, and Panel B reports the correlation matrix among the dependent variable, test variables, and control variables used in the main analyses. The ** indicates significance at the 5 percent level, and *** indicates significance at the 1 percent level using two-tailed tests. The sample contains observations where there are at least two team members/respondents in each team. There are 251 observations in this sample. All the variable definitions are reported in Appendix B.

TABLE 2
Main results for the hypotheses

	(1) *MeanAQTB*	(2) *MeanAQTB*	(3) *MeanAQTB*
SubDis	0.724***		0.714***
	(0.00)		(0.00)
SumComDis		0.120***	0.112***
		(0.01)	(0.01)
LnAge	1.058	0.215	1.108
	(0.17)	(0.78)	(0.15)
Female	-0.010	-0.489	-0.049
	(0.98)	(0.15)	(0.88)
TeamRole	-0.010	-0.083	-0.010
	(0.94)	(0.54)	(0.94)
LnYrExpEngagement	0.498*	0.240	0.528**
	(0.05)	(0.35)	(0.04)
LnHourSpent	0.657**	0.307	0.642**
	(0.01)	(0.22)	(0.01)
LnTA	0.636***	0.476**	0.566***
	(0.00)	(0.03)	(0.01)
ROA	2.571	2.687	2.643
	(0.69)	(0.66)	(0.67)
Leverage	-1.703	2.297	0.058
	(0.86)	(0.82)	(1.00)
Tenure	-0.305	-0.147	-0.293
	(0.48)	(0.74)	(0.46)
InvenTAratio	-7.176	-3.358	-5.764
	(0.63)	(0.83)	(0.68)
SalesGrowth	-1.255	-0.572	-1.286
	(0.37)	(0.67)	(0.34)
N	251	251	251
Pseudo R^2	0.136	0.116	0.141
Chi-squared	179.126	152.837	184.970
P-value	0.000	0.002	0.000

This table presents the main results of regressing the dependent variable, *MeanAQTB*, on the two test variables and control variables. The first test variable is *SubDis*, which measures how close an auditor feels to other team members. The second test variable is *SumComDis*, which is the sum of the scores of the questions measuring communication distance. All variable definitions can be found in Appendix B. Ordered logistic regressions were used. Fixed effects on audit teams were included. The p-values are reported in parentheses. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, and *** indicates significance at the 1 percent level using one-tailed tests.

TABLE 3
Robustness tests using ordinary least square (OLS)

	(1) *MeanAQTB*	(2) *MeanAQTB*	(3) *MeanAQTB*
SubDis	0.134***		0.129***
	(0.00)		(0.00)
SumComDis		0.029**	0.026**
		(0.03)	(0.03)
LnAge	0.049	-0.095	0.050
	(0.82)	(0.67)	(0.82)
Female	-0.054	-0.140	-0.064
	(0.57)	(0.14)	(0.49)
TeamRole	-0.009	-0.018	-0.008
	(0.83)	(0.66)	(0.84)
LnYrExpEngagement	0.074	0.055	0.089
	(0.31)	(0.46)	(0.22)
LnHourSpent	0.124*	0.069	0.118*
	(0.08)	(0.34)	(0.10)
LnTA	0.014	0.006	0.024
	(0.77)	(0.91)	(0.64)
ROA	0.409	0.379	0.420
	(0.26)	(0.31)	(0.24)
Leverage	-0.038	0.156	-0.377
	(0.96)	(0.83)	(0.54)
Tenure	0.064	0.051	0.070
	(0.12)	(0.23)	(0.16)
InvenTAratio	-0.618	-0.662	-0.539
	(0.38)	(0.36)	(0.44)
SalesGrowth	-0.045	-0.023	-0.038
	(0.32)	(0.61)	(0.44)
N	251	251	251
Adj. R2	0.128	0.067	0.146
P-value	0.049	0.191	0.030

This table presents the results of regressing the dependent variable, *MeanAQTB*, on the two test variables and control variables using the ordinary least square (OLS) model. The first test variable is *SubDis*, which measures how close an auditor feels to other team members. The second test variable is *SumComDis*, which is the sum of the scores of the questions measuring communication distance. All variable definitions can be found in Appendix B. Fixed effects on audit teams were included. The p-values are reported in parentheses. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, and *** indicates significance at the 1 percent level using one-tailed tests.

TABLE 4
Results using AQTB constructed from factor analysis

	(1) AggAQTB	(2) AggAQTB	(4) AggAQTB
SubDis	0.709***		0.702***
	(0.00)		(0.00)
SumComDis		0.109**	0.103**
		(0.02)	(0.02)
LnAge	0.900	0.111	0.951
	(0.23)	(0.88)	(0.21)
Female	-0.106	-0.561*	-0.135
	(0.75)	(0.09)	(0.68)
TeamRole	-0.043	-0.114	-0.043
	(0.75)	(0.39)	(0.75)
LnYrExpEngagement	0.495*	0.235	0.523**
	(0.05)	(0.36)	(0.04)
LnHourSpent	0.665***	0.324	0.650**
	(0.01)	(0.19)	(0.01)
LnTA	0.664***	0.500**	0.596***
	(0.00)	(0.02)	(0.00)
ROA	1.840	2.079	1.880
	(0.78)	(0.74)	(0.76)
Leverage	-2.206	1.691	-0.674
	(0.83)	(0.87)	(0.94)
Tenure	-0.306	-0.150	-0.294
	(0.49)	(0.74)	(0.47)
InvenTAratio	-6.243	-2.590	-4.942
	(0.69)	(0.87)	(0.73)
SalesGrowth	-1.299	-0.611	-1.341
	(0.37)	(0.66)	(0.34)
N	251	251	251
Pseudo R^2	0.080	0.069	0.083
Chi-squared	181.042	154.579	186.179
P-value	0.000	0.001	0.000

This table presents the regression results using an alternative measure of AQTB, *AggAQTB*, which is constructed based on the weights from the factor analysis of AQTB. The three test variables are the same as those in the main tests, that is, *SubDis*, *SumComDis*, and *LnPhyDis*. All variable definitions can be found in Appendix B. Ordered logistic regressions were used. Fixed effects on audit teams were included. The p-values are reported in parentheses. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, and *** indicates significance at the 1 percent level using one-tailed tests.

TABLE 5

Results when controlling for auditors' physical location

	(1) *MeanAQTB* OLOGIT	(2) *MeanAQTB* OLS	(3) *AggAQTB* OLOGIT	(4) *AggAQTB* OLS
SubDis	0.721***	0.132***	0.708***	0.662***
	(0.00)	(0.00)	(0.00)	(0.00)
SumComDis	0.111**	0.024**	0.101**	0.119**
	(0.02)	(0.03)	(0.03)	(0.04)
PhyDisDummy	-0.638	-0.164	-0.595	-0.768
	(0.14)	(0.17)	(0.17)	(0.20)
LnAge	0.886	-0.005	0.737	-0.020
	(0.26)	(0.98)	(0.34)	(0.99)
Female	-0.024	-0.054	-0.112	-0.264
	(0.94)	(0.56)	(0.73)	(0.57)
TeamRole	-0.069	-0.020	-0.097	-0.111
	(0.63)	(0.63)	(0.49)	(0.59)
LnYrExpEngagement	0.485*	0.083	0.485*	0.440
	(0.06)	(0.25)	(0.06)	(0.22)
LnHourSpent	0.595**	0.105	0.603**	0.551
	(0.02)	(0.14)	(0.02)	(0.13)
LnTA	0.604***	0.019	0.628***	0.129
	(0.00)	(0.69)	(0.00)	(0.59)
ROA	1.564	0.362	0.925	1.649
	(0.80)	(0.32)	(0.88)	(0.36)
Leverage	-1.307	0.065	-1.916	-0.028
	(0.89)	(0.93)	(0.84)	(0.99)
Tenure	-0.299	0.050	-0.299	0.249
	(0.46)	(0.23)	(0.47)	(0.23)
InvenTAratio	-4.739	-0.490	-3.941	-2.045
	(0.74)	(0.48)	(0.79)	(0.56)
SalesGrowth	-1.322	-0.050	-1.367	-0.243
	(0.33)	(0.26)	(0.33)	(0.28)
N	251	251	251	251
Adj. R2		0.151		0.153
Pseudo R2	0.142		0.084	
Chi-squared	187.140		188.114	
p-value	0.000	0.027	0.000	0.026

This table presents the regression results when we add a control variable, PhyDisDummy, which is equal to 1 for a team member not located in the local audit office and 0 for a team member located in the local audit office. The first two columns use MeanAQTB as the dependent variable, while the last two columns use AggAQTB as the dependent variable. We use both OLOGIT and OLS for the analyses. All variable definitions can be found in Appendix B. Ordered logistic regressions were used. Fixed effects on audit teams were included. The p-values are reported in parentheses. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, and *** indicates significance at the 1 percent level using one-tailed tests.

TABLE 6

Results for analyses at the audit team level

	(1) *AQTB_Team*	(2) *AQTB_Team*
SubDis_Team	0.630***	0.473**
	(0.00)	(0.01)
ComDis_Team	-0.152	-0.149
	(0.68)	(0.68)
LargeTeam		0.876**
		(0.04)
LnTA	0.252**	
	(0.01)	
ROA	-0.687	-0.641
	(0.45)	(0.48)
Leverage	-0.143	0.174
	(0.85)	(0.81)
Tenure	-0.050	-0.028
	(0.17)	(0.43)
InvenTAratio	0.525	-0.026
	(0.74)	(0.99)
SalesGrowth	-0.254*	-0.228
	(0.07)	(0.11)
N	101	101
Pseudo R^2	0.026	0.023
Chi-squared	18.203	15.941
P-value	0.020	0.043

This table presents the results for regressions at the audit team level. We aggregate the variables across team members in the same team and compute the mean value for each team. Column (1) reports the results of regressing AQTB at the team level (*AQTB_Team*) on the two test variables at the team level (*SubDis_Team*and *ComDis_Team*) and the control variables. Column (2) reports the results of regressing *AQTB_Team* on the two test variables at the team level and *LargeTeam*, which is 1 if the team size (i.e., the number of team members) is above the median and 0 otherwise. All variable definitions can be found in Appendix B. Ordered logistic regressions were used. The p-values are reported in parentheses. * indicates significance at the 10 percent level, ** indicates significance at the 5 percent level, and *** indicates significance at the 1 percent level.