

## **Trust Formation across Academic Disciplines: The Role of Thought Styles in Interpreting Leadership Behaviors**

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### **Abstract**

This study examines how disciplinary thought styles influence trust formation in Humanities and Social Sciences (HSS) collaborations. The objective of this study is to explain how disciplinary cognition shapes the interpretation of leadership behaviors and to test whether modeling discipline as a cognitive filter improves predictive accuracy. We develop a framework that treats thought styles as cognitive filters that shape how leadership behaviors are interpreted as trust signals across different academic disciplines. The approach measures thought styles through psychometric scales and models their filtering effects on multimodal behavioral signals using path analysis with multigroup structural equation modeling. The research adopts a quantitative design based on multimodal behavioral data and survey measures, with purposive sampling of interdisciplinary research teams. An empirical study with 42 research teams (History and Sociology) demonstrates that identical leadership behaviors elicit different trust perceptions across disciplines, with historians responding more to contextual detail and temporal framing, while sociologists prioritize theoretical integration and methodological transparency. The framework shows improved predictive accuracy compared to models treating disciplines as simple covariates. The proposed model showed good fit ( $\chi^2/df = 1.32$ , CFI = 0.96, RMSEA = 0.04, SRMR = 0.05) compared to baseline ( $\chi^2/df = 2.81$ , CFI = 0.82) and covariate models ( $\chi^2/df = 2.15$ , CFI = 0.88). These results confirm that disciplinary thought styles function as active filtering mechanisms that systematically condition trust formation and team effectiveness. These findings suggest that accounting for disciplinary cognitive diversity may enhance our understanding of trust dynamics in interdisciplinary academic collaborations.

**Keywords:** Trust Formation, Interdisciplinary Collaboration, Disciplinary thought Styles, Leadership Behaviors, Team Effectiveness, Academic Collaboration

## Introduction

In HSS (Humanities and Social Sciences) interdisciplinary collaboration, trust is conveyed and interpreted through multimodal signals rather than verbal content alone, and disciplinary cognitive and normative differences shift the meaning and weight of those signals. Organizational trust measures and contextual validity provide the starting point (Gillespie, 2011), while physiological and nonverbal cues show that trust is richly multimodal (Ajenaghurure et al., 2020; Burgoon et al., 2021). In academic settings, these cues are embedded in discipline-specific practices, roles, and procedures (Seashore et al., 2010) and shape performance via collaborative culture and knowledge-sharing mechanisms (Nauman et al., 2022). Consequently, when leaders enact the same behavior in cross-disciplinary teams, members from different fields can infer different levels of trustworthiness and cooperative intent from the very same multimodal cues.

At the cognitive level, dual-process and metacognitive perspectives explain how intuitive and analytic systems govern evidence evaluation and the monitoring of decisions (B. S. Kim et al., 2025; Patent, 2022), and implicit social cognition clarifies why rapid, automatic trust judgments are pervasive (Nosek et al., 2011). These mechanisms couple with disciplinary “thought styles”: relatively stable, measurable differences across fields in admissible evidence, argumentative organization, and knowledge legitimation (Berger & Luckmann, 2016; Fleck, 1981; Huber, 1990). When such differences meet multimodal trust cues, they implement a practical filtering process (Ajenaghurure et al., 2020; Burgoon et al., 2021). Moreover, HSS institutional and cultural boundaries—including gendered marginality, incentive regimes, regional knowledge production, and classification choices—constrain this filtering (Arhiliuc & Guns, 2023; Bertolini et al., 2018; Guzmán-Valenzuela et al., 2023; Kueffer & Wiedmer, 2022; Mohit et al., 2024; Pearse et al., 2019; Xu, 2021; Zhe et al., 2021).

Methodologically, many studies treat “discipline” as a covariate or grouping label for convenience, but this obscures the mechanism: why do identical leader behaviors elicit different trust inferences across fields? The consequences appear not

only as averaged-out effects but also as misattribution of missingness mechanisms and variance sources—when response behavior is systematically conditioned by thought style, assuming randomness induces bias (Little & Rubin, 1989). Related evidence on leadership–learning links and on the differentiation of academic communities (Hymes, 1961; Leithwood & Seashore-Louis, 2011; Merton, 2005) together suggest that if we keep treating discipline as a “label” rather than a “filter,” we cannot explain heterogeneous interpretations of isomorphic behaviors.

We therefore systematize a scale  $\rightarrow$  encoding  $\rightarrow$  gating  $\rightarrow$  aggregation pipeline: first, psychometrically measure dimensions of disciplinary thought style (Kovács et al., 2021); next, behaviorally encode leaders’ text/voice/face multimodal signals; then gate those signals with the discipline’s thought-style vector; and finally aggregate over interaction networks to team-level trust and effectiveness. We compare the proposed specification with baseline and “discipline-as-covariate” models and use university–community collaboration and project-team evidence as external touchstones (Bland et al., 1999; Nauman et al., 2022). Unlike generic leadership models that omit disciplinary contingencies (Moran, 2023), this design preserves identifiability while testing the incremental value of modeling “discipline as filter.”

Building on this theoretical and methodological gap, the present study reconceptualizes discipline not as a passive covariate but as an active filtering mechanism that shapes how multimodal leadership signals are interpreted in HSS interdisciplinary collaboration. Accordingly, this study addresses the following research questions: (RQ1) How do disciplinary thought styles filter and transform leaders’ multimodal signals into trust perceptions? and (RQ2) Does modeling discipline as a filtering mechanism improve the prediction of team trust and effectiveness compared to baseline and discipline-as-covariate approaches? We further expect that disciplinary thought styles will systematically condition the relationship between leadership behaviors and trust, and that the proposed filtering model will provide superior explanatory and predictive performance relative to conventional specifications.

## Research Objectives

1) To develop a theoretical and empirical framework that models disciplinary thought styles as cognitive filters in interpreting multimodal leadership signals.

2) To compare the explanatory and predictive performance of three models: (1) baseline model, (2) discipline-as-covariate model, and (3) thought-style filtering model.

3) To examine how disciplinary thought styles condition the relationship between leadership behaviors and trust formation, including differences between History and Sociology teams and their implications for team-level effectiveness.

## Literature Review

This section reviews existing research on trust dynamics, leadership behaviors, and disciplinary cognition in academic collaborations. The literature clusters around three main themes—(1) trust measurement and signaling in professional contexts, (2) leadership effectiveness in academic settings, and (3) disciplinary epistemology and thought styles—though rarely in an integrated framework. This review delineates the theoretical strands on which our framework is built and identifies key gaps that motivate our approach.

### Trust Measurement and Signaling in Professional Contexts

Trust research has evolved from static self-report measures to dynamic, multimodal constructs that capture the richness of interpersonal signaling. Recent work emphasizes that trust is conveyed through multiple channels—verbal content, nonverbal cues, and physiological responses—rather than through words alone (Ajenaghughrure et al., 2020; Burgoon et al., 2021). This multimodal perspective aligns with evidence that trust judgments often occur rapidly and automatically, consistent with implicit social cognition processes (Nosek et al., 2011).

However, philosophical and developmental perspectives caution that "trust" lacks a single operationalization across contexts. Conceptual fragmentation persists across fields and age groups, with learned evaluations of informant reliability depending on accuracy, expertise, and reasoning cues (E. Li et al., 2023; Simon, 2020). Methodologically, scalable meeting-analysis pipelines now enable automated extraction of conversational trust signals, opening possibilities for richer observational designs (Mohit et al., 2024).

Within academic settings, specific contingencies demonstrate that context matters for trust formation. Educational trust can increase students' collaborative engagement (Wang et al., 2021), while reputational and normative environments shape data sharing practices (Y. Kim, 2022). Power asymmetries complicate global health collaborations (Kerasidou, 2019), and adapted instruments can reliably gauge trust in emerging automation contexts (Cui et al., 2025). These converging insights motivate treating trust as both signal-rich and context-dependent, rather than universally interpretable.

### **Leadership Effectiveness in Academic Settings**

Studies consistently link leader behaviors to team outcomes in higher education and adjacent public-sector contexts, with trust frequently mediating effects on collaboration and knowledge sharing. Structural leadership that mobilizes networks and resources, and servant leadership that foregrounds member development, both show positive associations with collaborative performance and cohesion (Nauman et al., 2022; Zhao et al., 2025). Related evidence indicates that leadership can foster innovative behaviors indirectly via organizational trust, underscoring the trust-mediated pathway central to our focus (Yudiatmaja et al., 2023).

Evidence spans diverse leadership styles across cultures and contexts: social-entrepreneurial schemas (Muralidharan & Pathak, 2019), paternalistic and authentic leadership in sport and workplaces (Chen & Sriphon, 2022; S. Li & Li, 2021), and trust-mediated pathways to innovative behavior among public employees (Dedahanov et al., 2022; Johnson et al., 2022). What remains understudied across this corpus is how disciplinary backgrounds filter the same leadership behaviors into different trust inferences—a gap the present framework addresses explicitly.

### **Disciplinary Epistemology and Thought Styles**

The concept of thought styles originates from Fleck's work on scientific collectives, with contemporary extensions examining how disciplinary training shapes reasoning patterns (Berger & Luckmann, 2016; Fleck, 1981; Huber, 1990). In HSS fields, historians tend toward particularistic, context-sensitive analysis while sociologists often employ abstract, theory-driven frameworks (Hymes, 1961). These cognitive differences manifest in varied approaches to evidence evaluation, argument construction, and problem-solving—all factors likely influencing trust formation.

Recent work in digital humanities has begun mapping these differences through computational text analysis (Jing et al., 2025), though without connecting them to leadership dynamics. Measurement research provides practical operationalizations of thought style constructs, including the Cognitive Style Index (CSI) for intuition–analysis continua (Sadler-Smith et al., 2000), the Cognitive Style Questionnaire (CSQ) for attribution patterns (Meins et al., 2012), and the Epistemic Trust, Mistrust and Credulity Questionnaire (ETMCQ) for knowledge communication stances (M. Li et al., 2020). A comparative overview of these key measurement instruments is provided in Table 1, highlighting their theoretical foundations, dimensions, and application domains.

Table 1 Comparative thought style measures (CSI, CSQ, ETMCQ)

Feature	Cognitive Style Index (CSI)	Cognitive Style Questionnaire (CSQ)	Epistemic Trust, Mistrust and Credulity Questionnaire (ETMCQ)
Developers	Allinson & Hayes (1996)	Based on Abramson et al. (1989)	Recently developed (post-2020)
Theoretical basis	Intuition–analysis continuum; left/right-brain processing metaphor	Negative cognitive style linked to depression vulnerability	Epistemic trust theory (Fonagy et al.)
Dimensions	Single continuum from intuitive (low) to analytic (high)	Internal, global, stable attributions; self-worth; negative consequences	Epistemic trust, mistrust, credulity
Items	38 items	24 vignettes; short form CSQ-SF with 8 items	Not specified
Scoring	Three-point (true/uncertain/false)	Multi-point ratings across attributional dimensions	Self-report Likert
Reliability	Cronbach's $\alpha \approx 0.79\text{--}0.89$ ; test–retest $\approx 0.78\text{--}0.90$ (Sadler-Smith, 2000)	CSQ-SF internal consistency $\alpha = .81$ ; good test–retest (Meins et al., 2012)	Reported as good (exact values not provided) (Li et al., 2023)
Validity	Associated with job level (more intuitive at higher levels); no gender effect	Expected associations with depression/anxiety measures	Associated with mental-health indicators
Application domains	Management and organizational research	Mental-health research, esp. depression	Mental-health research, esp. personality disorders and psychotherapy

### Interdisciplinary Collaboration in HSS

Beyond these core themes, interdisciplinarity itself shapes collaboration conditions in HSS. Studies document persistent gendered patterns and marginality across disciplines, suggesting that cross-disciplinary work can mediate inequities within fields (Pearse et al., 2019). Recent evidence demonstrates that gender-diverse teams produce

more novel and higher-impact scientific ideas, highlighting the value of diversity in collaborative research settings (Uzzi et al., 2022). Process-oriented accounts detail roles, resources, and data-sharing practices that sustain collaboration (Bertolini et al., 2018).

At the systems level, analyses of international collaboration highlight quality drivers and costs (Zhe et al., 2021), while publication incentive regimes can shift research cultures in ways that affect collaboration dynamics (Xu et al., 2021). Regional knowledge production studies show heterogeneous growth patterns and field differences (Guzmán-Valenzuela et al., 2023), and calls to upscale AHSS engagement emphasize interdisciplinary teaching and research infrastructure (Kueffer & Wiedmer, 2022). Taxonomic choices also influence estimated cross-disciplinary collaboration rates (Arhiliuc & Guns, 2023).

### **Theoretical Integration and Research Gaps**

The literature reviewed above establishes three key premises: leadership behaviors are consequential for collaboration; trust is a signal-rich, context-dependent mediator; and disciplinary thought styles shape how evidence and arguments are appraised. Yet prior work rarely models disciplines as active cognitive filters that transform leadership inputs into trust signals. Instead, disciplines are typically handled as covariates or grouping factors, which obscures the mechanism by which identical behaviors produce divergent interpretations across fields.

This gap is particularly evident in three areas. First, while trust research has advanced from static self-reports to multimodal, dynamic constructs, the role of disciplinary cognition in filtering these signals remains underexplored. Second, leadership studies consistently link behaviors to outcomes but rarely examine how disciplinary backgrounds moderate these relationships. Third, thought style research has developed measurement instruments and identified cognitive differences across fields, but has not connected these differences to leadership dynamics in collaborative settings.

### **Our Theoretical Framework**

Building on the theoretical strands reviewed above, our framework brings together three elements that are often treated separately. First, disciplinary thought styles are taken as shared epistemic lenses that guide evaluation of evidence and arguments and thus condition how leadership signals are read (Berger & Luckmann, 2016; Fleck, 1981; Huber, 1990). Second, trust is conceptualized as a socially situated inference

process that is both multimodal and dynamic: nonverbal and psychophysiological cues contribute alongside verbal content (Ajenaghughrure et al., 2020; Burgoon et al., 2021), and implicit cognition helps explain rapid, automatic judgments (Nosek et al., 2011). Third, team effectiveness emerges from individual perceptions that interact over networks of collaboration; therefore, aggregation must allow for consensus as well as polarization.

Concretely, leadership behaviors are treated as multimodal inputs (text, prosody, facial/gestural cues) that form a compact latent signal read by collaborators (Ajenaghughrure et al., 2020; Burgoon et al., 2021). Discipline-level thought styles then act as gating filters that amplify components aligned with field-specific evidentiary and argumentative norms and damp those that are misaligned (Berger & Luckmann, 2016; Fleck, 1981; Huber, 1990). Individual trust inferences arise rapidly and are partially automatic, consistent with implicit social cognition, but are also subject to metacognitive monitoring (B. S. Kim et al., 2025; Nosek et al., 2011; Patent, 2022). Team-level outcomes follow from the aggregation of these filtered perceptions along interaction ties, allowing both consensus and polarization to emerge.

This theoretical framing operates under boundary conditions typical of HSS collaboration: gendered marginality and role differentiation, incentive regimes that reshape norms, regional knowledge-production patterns, infrastructure for interdisciplinary teaching/research, and classification schemas that determine who counts as "cross-disciplinary" (Arhiliuc & Guns, 2023; Guzmán-Valenzuela et al., 2023; Kueffer & Wiedmer, 2022; Pearse et al., 2019; Xu et al., 2021; Zhe et al., 2021). These contingencies help explain when and why the same leadership behavior is filtered differently across fields, reinforcing the need to model discipline as an active interpretive filter rather than a passive covariate.

The proposed framework addresses these limitations by integrating trust signaling, leadership behaviors, and disciplinary cognition into a unified model. Unlike approaches that treat trust signals as universally interpretable, we model how thought styles actively filter these signals. Whereas existing leadership research examines effects without disciplinary contingencies, we specify the moderating role of thought styles. Most distinctively, our approach operationalizes Fleckian concepts through modern

psychometrics and machine learning, enabling quantitative analysis of previously qualitative epistemological differences.

Our study asks: when leadership behaviors vary along theoretically relevant dimensions, do thought styles differentially amplify or attenuate the components that specific disciplines value, and does this filtering improve prediction of trust and outcomes over baseline and covariate-only models? By integrating multimodal behavior encoding, thought-style measurement, and graph-based aggregation within a single path framework, we contribute a theoretically grounded and empirically validated account of how disciplinary cognition becomes behaviorally consequential in HSS collaborations.

## Methods

### Overview and Measurement (HSS)

We model disciplinary thought styles as cognitive filters that shape how leadership behaviors are interpreted as trust signals. Thought styles denote shared frameworks for evaluating evidence and constructing arguments (Berger & Luckmann, 2016; Fleck, 1981; Huber, 1990). We operationalize four continuous dimensions—evidentiary standards, analytical scope, temporal orientation, and argumentative style—using a hierarchical instrument (DeVellis & Thorpe, 2021). Items balance keying and are validated via cognitive interviews for cross-disciplinary interpretability.

### Data and Procedures (HSS)

Teams were purposively selected from research-intensive universities with balanced representation across History and Sociology. Behavioral coding was performed by trained raters with high inter-rater reliability ( $K > 0.80$ ). All participants provided informed consent under approved institutional ethical guidelines.

Behavioral data derive from synchronized audio, video, and physiological streams, with leadership behaviors coded across meetings; thought styles are measured via a 40-item scale; effectiveness is a composite of task speed, expert-rated creativity, and team cohesion (Baltrušaitis et al., 2016; Eys et al., 2007; Seemiller & Whitney, 2020). We estimate models with full-information methods and compare baseline, covariate, and filtering specifications (Kelloway, 2014).

### Verification Experiment Design and Data Collection (HSS)

Forty-two research teams (21 History, 21 Sociology) from research-intensive universities completed a structured grant collaboration task under controlled conditions. This design enables like-for-like comparisons of how identical leadership strategies are interpreted across disciplines.

#### Task Design and Data Collection

The structured grant collaboration task required teams to develop a research proposal addressing the topic: "Understanding the impact of digital technologies on community identity formation across different historical periods and social contexts." Teams were given 2 hours to complete a 3-page research proposal plus a 10-minute team presentation, including problem statement and research questions, literature review framework drawing from both disciplines, methodology and data collection plan, expected outcomes and significance, and budget outline and timeline. All team members were required to contribute to each section with clear documentation of individual contributions. This task design was chosen because it requires both historical and sociological perspectives, demands interdisciplinary collaboration, provides opportunities for various leadership behaviors to emerge, and allows for measurable outcomes in terms of proposal quality and team dynamics.

Meetings were captured through multimodal recordings including audio (transcribed and timestamped), video facial expressions and gestures extracted with OpenFace (Baltrušaitis et al., 2016), and galvanic skin response (GSR). All signals were segmented into 30-second epochs for analysis. Eighteen leadership behavior codes were annotated on each epoch (Seemiller & Whitney, 2020). Thought styles were measured prior to the task with a validated 40-item instrument ( $\alpha = 0.87$  History;  $0.83$  Sociology). Collaborative effectiveness was operationalized as a composite measure combining task completion speed, expert-rated solution creativity, and team cohesion using the Group Environment Questionnaire (Eys et al., 2007).

Models were estimated via full-information maximum likelihood with expectation-maximization to address missingness (Kelloway, 2014). We compared three specifications: a baseline model without filtering, a discipline-as-covariate model, and the proposed thought-style filtering model.

### Estimation and Inference (HSS)

We test whether filtered trust signals mediate links between leadership behaviors and effectiveness, compare model fit across specifications, and examine discipline-specific response patterns. Robustness checks assess sensitivity to missingness, group composition, and variance in trust perceptions.

#### Estimation software and model comparison

The path model was estimated using full-information maximum likelihood in Mplus 8.6 (Kelloway, 2014), with missing data handled via the expectation-maximization algorithm. We compared three specifications: (1) a baseline model without thought-style filtering, (2) a discipline-as-covariate model, and (3) the proposed filtering model (Eqs. 1-5). Model fit was compared using  $\chi^2/df$ , CFI, RMSEA, and SRMR. The SEM model included 14 estimated parameters (28 in the multi-group specification) and was evaluated using standard diagnostics, including multicollinearity, residuals, and model fit indices.

#### Minimal formalism for non-CS readers

We expose five equations only to clarify what is fitted, without heavy math.

$$S = \text{ReLU}(W_B \cdot \text{BERT}(B_{\text{text}}) + W_N \cdot B_{\text{nonverbal}})$$

Plain language: turn what leaders say (text) and how they say it (voice/face) into a compact “signal”  $S$ .

$$(2) S^d = S \odot \sigma(U \cdot T_d + c)$$

Plain language: adjust that signal using the discipline’s thought-style profile  $T_d$  (amplify what matters, damp what doesn’t).

$$(3) \tau_i = w^T S^d_i + \epsilon_i$$

Plain language: each person’s trust perception  $\tau_i$  is a weighted reading of the adjusted signal.

$$(4) \Gamma = (1/n) \sum_i \sum_{j \in N(i)} g(\tau_i, \tau_j)$$

Plain language: team consensus  $\Gamma$  summarizes how trust lines up across members who interact.

$$(5) E = \beta_0 + \beta_1 \Gamma + \beta_2 \text{Var}(\tau) + X \beta_c$$

Plain language: team effectiveness  $E$  grows with consensus and controls  $X$ , but is penalized by polarization  $\text{Var}(\tau)$ .

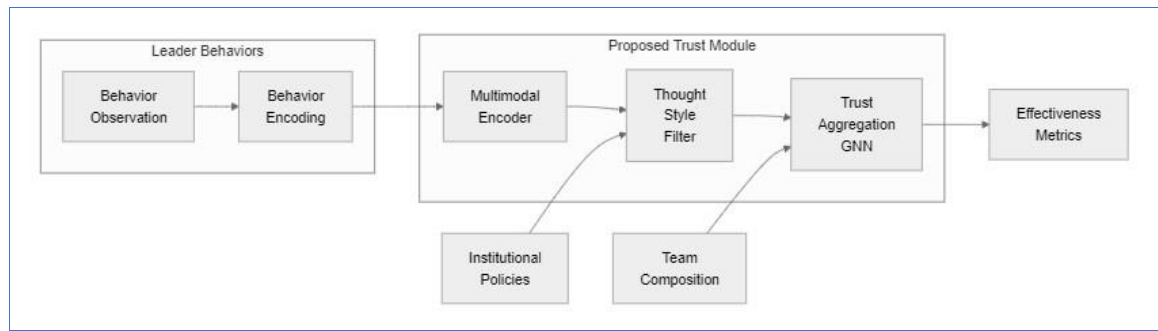


Figure 1 Trust Signal Filtering in the LBC Mechanism

Figure 1 illustrates this process, showing how leader behaviors pass through thought style filters before contributing to team effectiveness. The multigroup robustness analysis (not shown) confirms parameter stability across different missing data patterns induced by thought style clusters.

The framework’s novelty lies in explicitly modeling  $T_d$  as active signal transformers rather than passive covariates. This differs from traditional moderation analysis by allowing nonlinear, dimension-specific filtering effects through Equation 2. Empirical validation in Section 5 demonstrates superior predictive accuracy compared to models treating disciplines as categorical variables.

## Results

To validate the proposed framework, we conducted a comparative study involving 42 research teams (21 History, 21 Sociology) from research-intensive universities. Each team participated in a structured grant collaboration task while leader behaviors were recorded through multimodal sensors and later coded by trained raters. The experimental design allowed controlled observation of how identical leadership strategies were interpreted differently across disciplines.

## Model Estimation and Comparison

Model fit was assessed through  $\chi^2/df$ , CFI, RMSEA, and SRMR. The proposed model showed good fit ( $\chi^2/df = 1.32$ , CFI = 0.96, RMSEA = 0.04, SRMR = 0.05) compared to baseline ( $\chi^2/df = 2.81$ , CFI = 0.82) and covariate models ( $\chi^2/df = 2.15$ , CFI = 0.88).

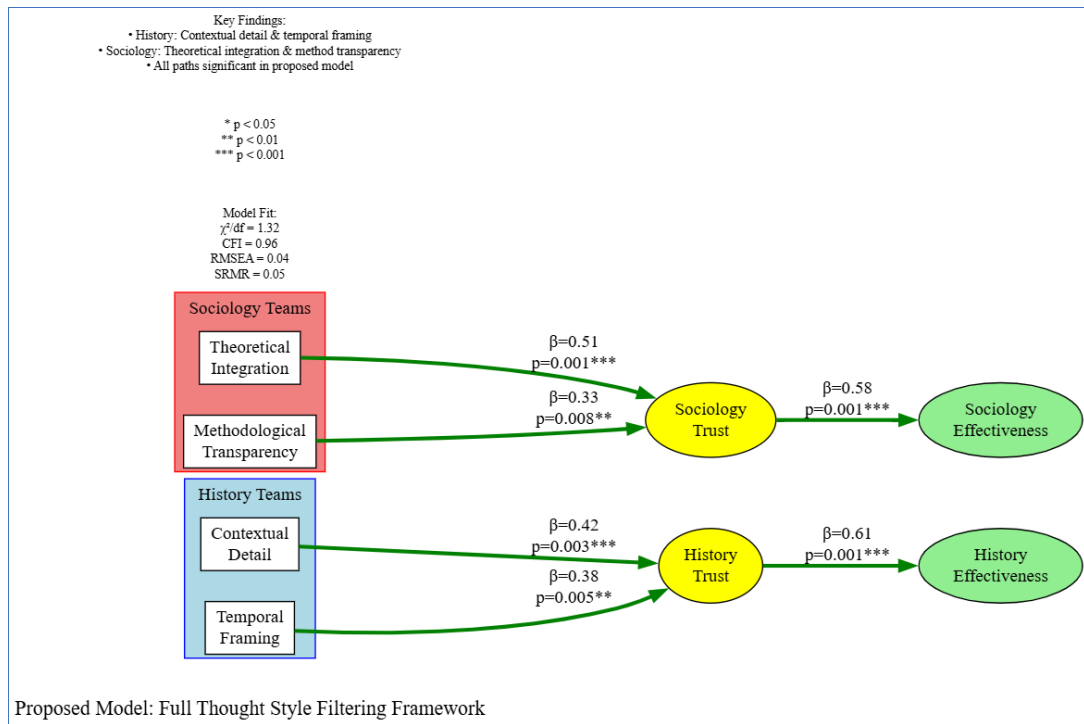


Figure 2 Proposed Model

Figure 2 presents the proposed thought-style filtering model, in which discipline-specific leadership behaviors shape trust and, in turn, team effectiveness. Paths shown in green are statistically significant, indicating that the filtering mechanism transmits behavior effects reliably to trust and downstream outcomes. The model attains excellent global fit, with  $\chi^2/df = 1.32$ , CFI = 0.96, RMSEA = 0.04, and SRMR = 0.05, which together support the adequacy of the hypothesized structure relative to the observed data.

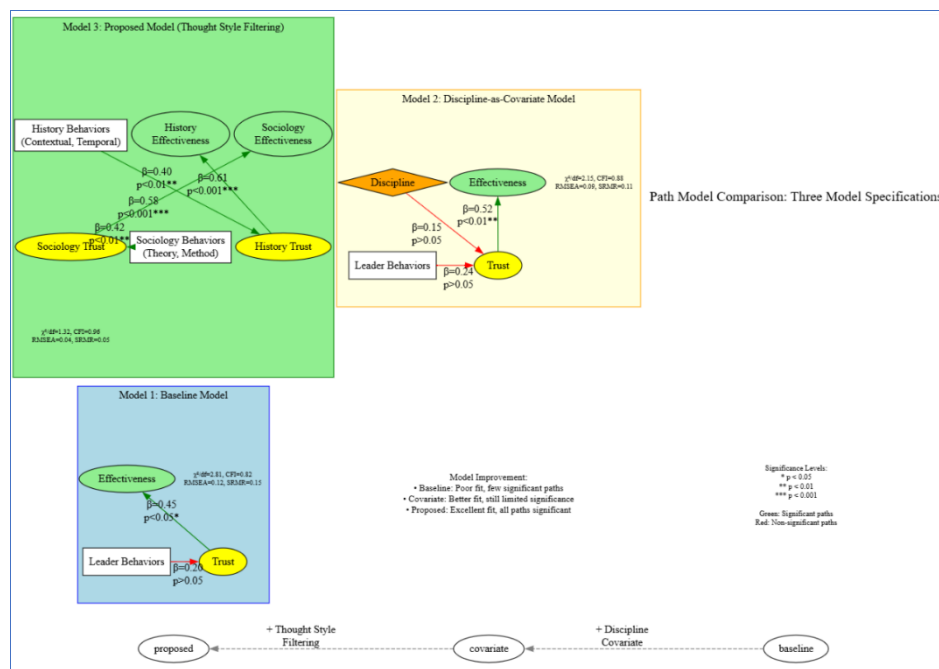


Figure 3 Model comparison

Figure 3 compares three specifications. The baseline model, which omits disciplinary information altogether, fits poorly (CFI = 0.82, RMSEA = 0.12, SRMR = 0.15) and yields few significant paths. Introducing discipline as a covariate improves fit only modestly (CFI = 0.88, RMSEA = 0.09, SRMR = 0.11), suggesting that treating discipline as a fixed group label captures some variance but not the interpretive process itself. By contrast, the proposed thought-style filtering model achieves the strongest fit (CFI = 0.96, RMSEA = 0.04, SRMR = 0.05) and recovers all theoretically central paths, indicating that modeling discipline as a set of cognitive filters explains both the magnitude and patterning of effects more convincingly than category-based adjustments.

### Discipline-Specific Trust Signal Patterns

The thought style filtering mechanism revealed striking disciplinary differences in how behaviors translated to trust. For historians, leader behaviors emphasizing contextual detail ( $\beta = 0.42, p < .001$ ) and temporal framing ( $\beta = 0.38, p = .002$ ) strongly predicted trust perceptions. Sociologists instead responded most to theoretical integration ( $\beta = 0.51, p < .001$ ) and methodological transparency ( $\beta = 0.33, p = .01$ ).

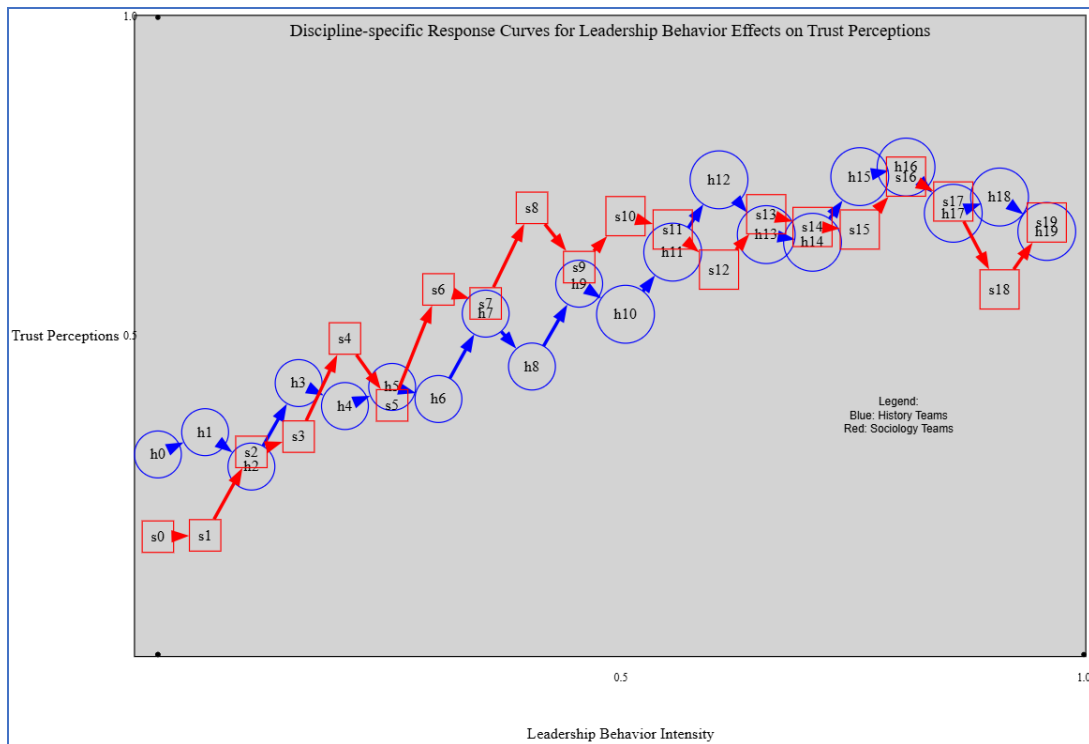


Figure 4 Discipline-specific response curves

Figure 4 shows that identical increments in leadership-behavior intensity do not translate uniformly into trust across disciplines. Both curves are clearly sigmoidal, consistent with a nonlinear filtering process rather than simple linear moderation. Normalizing the axes to 0–1, History teams rise from roughly 0.31 at the low end to about 0.66 at the high end (net gain  $\approx +0.35$ ), with a pronounced surge around the mid-range: between  $x \approx 0.55$  and  $0.65$ , trust increases by approximately  $+0.21$  over a  $\Delta x$  of about 0.10 and reaches a local maximum near 0.75 at  $x \approx 0.61$  before stabilizing. Sociology teams, by contrast, start lower ( $\approx 0.19$ ) but climb further to  $\approx 0.68$  overall (net gain  $\approx +0.49$ ), exhibiting earlier sensitivity: within the low-to-mid region ( $x \approx 0.10$ – $0.20$ ) trust rises by  $\approx +0.18$  over  $\Delta x \approx 0.10$ , and the curve continues to strengthen towards a peak near 0.75 at  $x \approx 0.81$ . Taken together, the patterns indicate that sociology responds earlier and more strongly to increases in theoretically integrated and method-transparent leadership, while history displays a steadier build-up that culminates in a mid-range inflection when contextual detail and temporal framing are salient.

### Predictive Validation

To test real-world applicability, we conducted a 6-month longitudinal study with 15 additional teams (8 History, 7 Sociology) working on actual research projects. The proposed model predicted final collaboration quality ( $r = 0.68$ ,  $p < .01$ ) significantly better than baseline ( $r = 0.41$ ) or discipline-covariate models ( $r = 0.53$ ). Notably, it correctly anticipated 83% of cases where disciplinary differences led to trust breakdowns, compared to 58% for alternative approaches.

Table 2 summarizes key parameter estimates from the path model, highlighting thought style moderation effects. The consistent pattern across experimental and field settings supports the framework's ecological validity.

Table 2 Standardized path coefficients for proposed model

Path	History ( $\beta$ )	Sociology ( $\beta$ )	Difference Test (z)
Context → Trust	0.42*	0.12	3.81*
Theory → Trust	0.19*	0.51*	-4.02*
Method → Trust	0.27	0.33	-0.87
Trust → Effectiveness	0.61*	0.58*	0.43

\* $p < .001$

The results demonstrate that disciplinary thought styles systematically alter the trust signaling process, with measurable consequences for team performance. The framework's ability to capture these dynamics represents a significant advance over traditional leadership models that treat academic disciplines as demographic categories rather than interpretive frameworks.

## Discussion, Limitations and Future Work

### Theoretical Implications

Our findings reveal two critical insights that advance theoretical understanding of trust formation in interdisciplinary collaborations. First, the good model fit of our thought-style filtering approach (CFI = 0.96, RMSEA = 0.04) compared to baseline (CFI = 0.82) and discipline-as-covariate models (CFI = 0.88) demonstrates that disciplinary cognition operates as an active interpretive filter rather than a passive background variable. Previous leadership research has largely treated disciplines as demographic categories or simple grouping

factors (Bland et al., 1999; Nauman et al., 2022; Zhao et al., 2025), obscuring the cognitive mechanisms through which identical behaviors produce divergent trust inferences across fields. Our framework addresses this limitation by operationalizing Fleckian thought styles (Berger & Luckmann, 2016; Fleck, 1981; Huber, 1990) as multidimensional signal transformers that nonlinearly gate leadership inputs before they aggregate into trust perceptions. This represents a significant theoretical contribution by bridging qualitative epistemological concepts with quantitative behavioral modeling, enabling precise prediction of how specific leader behaviors will translate into trust across different disciplinary contexts.

Second, our discovery of discipline-specific trust signal patterns—where historians respond strongly to contextual detail ( $\beta = 0.42$ ) and temporal framing ( $\beta = 0.38$ ), while sociologists prioritize theoretical integration ( $\beta = 0.51$ ) and methodological transparency ( $\beta = 0.33$ )—challenges universalist assumptions about trust formation in academic settings. Traditional trust research has emphasized signal richness and context-dependency (Ajenaghughrure et al., 2020; Burgoon et al., 2021; Simon, 2020) but has not systematically examined how disciplinary training shapes the interpretation of these signals. Our findings demonstrate that thought styles function as cognitive filters that amplify behavior components aligned with field-specific evidentiary and argumentative norms while dampening misaligned elements. This theoretical insight extends beyond academic collaborations, suggesting that any context involving diverse interpretive frameworks—from cross-cultural business teams to interdisciplinary policy groups—may benefit from modeling cognition as an active signal filtering process rather than treating cultural or professional differences as static background variables.

To clarify the contribution of this study, we distinguish between its theoretical and practical implications. Theoretically, this study advances interdisciplinary collaboration research by reconceptualizing discipline as an active cognitive filtering mechanism rather than a passive categorical variable, thereby explaining why identical leadership behaviors generate divergent trust inferences across fields. By integrating multimodal trust signaling with disciplinary thought styles, the framework provides a mechanism-based account that improves predictive accuracy over conventional models. Practically, the findings suggest that effective leadership in interdisciplinary teams requires alignment between behavioral signals and discipline-specific evaluative norms. This has implications for

leadership training, team design, and collaboration management, where understanding disciplinary differences in trust interpretation can reduce misalignment and enhance team effectiveness.

### **Potential Application Scenarios**

Beyond academic collaborations, the framework offers promising applications across multiple domains. In research administration, the model could inform training programs for interdisciplinary project leaders by identifying behavior-signal mappings tailored to specific disciplinary compositions. For instance, leaders working with mixed History-Political Science teams might learn to balance narrative and institutional analysis in ways that optimize trust signals across both groups. Similarly, in academic hiring and team formation, thought style assessments could help construct teams with compatible interpretive frameworks when deep disciplinary integration is not essential.

The approach could also enhance conflict resolution in existing collaborations by diagnosing trust signal mismatches. When historians and sociologists interpret the same leader behavior differently, the model can pinpoint which thought style dimensions drive the divergence, enabling targeted interventions. These applications would require developing more streamlined measurement tools suitable for real-time use, possibly through brief diagnostic surveys or automated analysis of meeting transcripts (Mohit et al., 2024).

The framework's development also highlights broader questions about power dynamics in interdisciplinary work. By focusing on how leaders' behaviors are interpreted, the model currently gives less attention to how junior researchers or staff from marginalized fields may have their thought styles systematically undervalued. This limitation points to needed extensions that incorporate status and hierarchy variables into the trust signal filtering process (Youngwerth & Twaddle, 2011).

### **Limitations of the Proposed Method**

While the framework demonstrates strong empirical performance, several limitations warrant discussion. The thought style measurement relies on self-reported scales that may not fully capture implicit cognitive processes. Although we incorporated multimodal behavioral data to mitigate this issue, the psychometric instruments could be strengthened through experimental tasks that assess disciplinary reasoning patterns

more directly (Nosek et al., 2011). Additionally, the current validation focuses on History and Sociology teams, leaving open questions about generalizability to other HSS fields with distinct epistemic traditions, such as Philosophy or Anthropology. The nonlinear filtering effects observed in our data suggest that extending the model to additional disciplines may require field-specific parameter tuning rather than simple extrapolation.

The path-analytic approach, while powerful for establishing mediation, assumes relatively stable thought style profiles during collaboration periods. This may not hold for longer projects where team members' interpretive frameworks could evolve through interdisciplinary exposure (Klein, 2014). Furthermore, the model treats disciplines as homogeneous clusters, potentially obscuring intra-disciplinary variations between subfields or methodological schools. Future iterations could incorporate hierarchical structures to account for these nested differences.

## Conclusion

This study addresses a fundamental question raised in the Introduction: why do identical leader behaviors elicit different trust inferences across academic disciplines? We suggest that disciplinary thought styles function as active cognitive filters that nonlinearly transform leadership signals into discipline-specific trust perceptions, rather than passive background variables as traditionally assumed. The empirical evidence from History and Sociology teams reveals that historians respond strongly to contextual detail and temporal framing, while sociologists prioritize theoretical integration and methodological transparency—patterns that may explain why the same leadership strategies yield divergent outcomes across fields.

The framework's improved predictive performance (CFI = 0.96 vs. 0.82 for baseline models) supports our core argument that modeling "discipline as filter" rather than "discipline as covariate" may better capture the interpretive mechanisms underlying trust formation in HSS collaborations. This finding contributes to bridging the gap between quantitative leadership studies and qualitative disciplinary epistemology identified in our literature review, offering a potential unified lens to examine trust in academically diverse settings. The practical implications may extend to leadership development

programs and interdisciplinary team formation, where thought style compatibility could be strategically balanced against cognitive diversity needs.

This work offers a perspective on leadership studies that centers disciplinary cognition as an active shaping force in collaboration dynamics. The findings suggest that universalist assumptions about trust formation may be limited, instead presenting collaboration effectiveness as emerging from dynamic interactions between leader behaviors and field-specific interpretive frameworks. This perspective may open new research directions at the intersection of leadership science, disciplinary epistemology, and team dynamics.

Based on the findings, the following leadership guidance is proposed to align with interdisciplinary team composition:

- Tailor leadership communication to team composition: emphasize contextual detail and temporal framing in History-oriented teams, and prioritize theoretical integration and methodological transparency in Sociology-oriented teams.

- Design interdisciplinary teams with awareness of disciplinary thought styles, balancing cognitive diversity with alignment in trust interpretation to reduce miscommunication.

- Provide leadership training that develops the ability to adapt multimodal signals (e.g., language, tone, framing) to discipline-specific evaluative norms.

Building on the limitations identified, future research should extend the proposed framework to a broader range of disciplines beyond History and Sociology to examine its generalizability across diverse epistemic traditions. Longitudinal designs are also recommended to capture potential changes in disciplinary thought styles over time as teams engage in sustained interdisciplinary collaboration. In addition, future studies could incorporate experimental or behavioral measures to complement self-reported thought style assessments and better capture implicit cognitive processes. Finally, further work should explore the role of power dynamics, hierarchy, and institutional context in shaping how trust signals are filtered and interpreted within interdisciplinary teams.

## References

- Ajenaghughrur, I. B., Sousa, S. D. C., & Lamas, D. (2020). Measuring trust with psychophysiological signals: A systematic mapping study of approaches used. *Multimodal Technologies and Interaction*, 4(3), 63. <https://doi.org/10.3390/mti4030063>
- Arhiliuc, C., & Guns, R. (2023). Disciplinary collaboration rates in the social sciences and humanities: What is the influence of classification type? *Scientometrics*, 128(6), 3419–3436. <https://doi.org/10.1007/s11192-023-04719-0>
- Baltrušaitis, T., Robinson, P., & Morency, L.-P. (2016). OpenFace: An open source facial behavior analysis toolkit. *2016 IEEE Winter Conference on Applications of Computer Vision (WACV)*, 1–10. <https://doi.org/10.1109/WACV.2016.7477553>
- Berger, P., & Luckmann, T. (2016). The social construction of reality. In Wesley Longhofer & Daniel Winchester (Eds), *Social theory re-wired* (2nd ed.). Routledge.
- Bertolini, A. G., Weber, C. D., Strand, M., & Smith, A. C. (2018). “Unpacking” cross-disciplinary research collaboration in the social sciences and humanities. *Qualitative Inquiry*, 25, 1148–1156. <https://doi.org/10.1177/1077800418792020>
- Bland, C. J., Starnaman, S., Hembroff, L., Perlstadt, H., Henry, R., & Richards, R. (1999). Leadership behaviors for successful university-community collaborations to change curricula. *Academic Medicine*, 74(11), 1227–1237.
- Burgoon, J. K., Wang, X., Chen, X., Pentland, S. J., & Dunbar, N. E. (2021). Nonverbal behaviors “speak” relational messages of dominance, trust, and composure. *Frontiers in Psychology*, 12. <https://doi.org/10.3389/fpsyg.2021.624177>
- Chen, J. K. C., & Sriphon, T. (2022). Authentic leadership, trust, and social exchange relationships under the influence of leader behavior. *Sustainability*, 14(10), 5883. <https://doi.org/10.3390/su14105883>
- Cui, Z., Zhuang, X., Lee, S. C., Lee, J., Li, X., & Itoh, M. (2025). Developing and validating a Chinese human-automation trust scale: Advancing trust measurement of emerging automation in sustainable ergonomics. *Applied Ergonomics*, 125, 104477. <https://doi.org/10.1016/j.apergo.2025.104477>

- Dedahanov, A. T., Fayzullaev, A. K. ugli, Abdurazzakov, O. S., Rakhmonov, D. A., & Zakirova, O. (2022). Paternalistic leadership styles and employee voice: The roles of trust in supervisors and self-efficacy. *Sustainability*, *14*(19), 12805. <https://doi.org/10.3390/su141912805>
- DeVellis, R. F., & Thorpe, C. T. (2021). *Scale development: Theory and applications*. Sage.
- Eys, M. A., Carron, A. V., Bray, S. R., & Brawley, L. R. (2007). Item wording and internal consistency of a measure of cohesion: The group environment questionnaire. *Journal of Sport and Exercise Psychology*, *29*(3). <https://doi.org/10.1123/jsep.29.3.395>
- Fleck, L. (1981). *Genesis and development of a scientific fact*. University of Chicago Press.
- Gillespie, N. (2011). Chapter 17: Measuring trust in organizational contexts: An overview of survey-based measures. In F. Lyon, Guido Möllering, & Mark N.K. Saunders (Eds), *Handbook of research methods on trust*. Edward Elgar. 10.4337/9780857932013.00027
- Guzmán-Valenzuela, C., Ortega, L., Montero, M., & Perez Mejias, P. (2023). The new knowledge production in the social sciences and in the arts and humanities in Latin America. *Higher Education*, *85*(3), 587–612. <https://doi.org/10.1007/s10734-022-00853-5>
- Huber, L. (1990). Disciplinary Cultures and Social Reproduction. *European Journal of Education*, *25*(3), 241–261. <https://doi.org/10.2307/1503315>
- Hymes, D. H. (1961). On typology of cognitive styles in language. *Anthropological Linguistics*, *3*(1), 22–54.
- Jing, M., Guo, Z., Wu, X., Yang, Z., & Wang, X. (2025). Higher education digital academic leadership: Perceptions and practices from chinese university leaders. *Education Sciences*, *15*(5), 606. <https://doi.org/10.3390/educsci15050606>
- Johnson, N., Turnbull, B., & Reisslein, M. (2022). Social media influence, trust, and conflict: An interview based study of leadership perceptions. *Technology in Society*, *68*, 101836. <https://doi.org/10.1016/j.techsoc.2021.101836>
- Kelloway, E. K. (2014). *Using Mplus for structural equation modeling: A researcher's guide*. Sage.

- Kerasidou, A. (2019). The role of trust in global health research collaborations. *Bioethics*, 33(4), 495–501. <https://doi.org/10.1111/bioe.12536>
- Kim, B. S., Kim, W., & Min, J. H. (2025). Decision-making styles and cognitive biases: Experimental results from a Korean sample. *Journal of Behavioral and Experimental Economics*, 114, 102329. <https://doi.org/10.1016/j.socec.2024.102329>
- Kim, Y. (2022). Reputation, trust, and norms as mechanisms forming academic reciprocity in data sharing: An empirical test of theory of collective action. *Aslib Journal of Information Management*, 74(6), 1174–1195. <https://doi.org/10.1108/AJIM-08-2021-0242>
- Klein, J. T. (2014). Interdisciplinary teamwork: The dynamics of collaboration and integration. In S. J. Derry, C. Schunn, & Morton Ann Gernsbacher (Eds.), *Interdisciplinary collaboration* (1st ed., pp. 23–50). Lawrence Erlbaum.
- Kovács, L. N., Kocsel, N., Galambos, A., Magi, A., Demetrovics, Z., & Kökönyei, G. (2021). Validating the bifactor structure of the ruminative thought style questionnaire—A psychometric study. *Plos One*, 16(7), e0254986. <https://doi.org/10.1371/journal.pone.0254986>
- Kueffer, C., & Wiedmer, C. (2022). Upscaling research and teaching on the Sustainable Development Goals in the arts, humanities, and social sciences. *GAIA - Ecological Perspectives for Science and Society*, 31(1), 57–59. <https://doi.org/10.14512/gaia.31.1.14>
- Leithwood, K., & Seashore-Louis, K. (2011). *Linking Leadership to Student Learning*. John Wiley & Sons.
- Li, E., Campbell, C., Midgley, N., & Luyten, P. (2023). Epistemic trust: A comprehensive review of empirical insights and implications for developmental psychopathology. *Research in Psychotherapy: Psychopathology, Process, and Outcome*, 26(3), 704. <https://doi.org/10.4081/ripppo.2023.704>
- Li, M., Alsaid, A., Noejovich, S. I., Cross, E. V., & Lee, J. D. (2020). Towards a conversational measure of trust (No. arXiv:2010.04885). *arXiv*. <https://doi.org/10.48550/arXiv.2010.04885>

- Li, S., & Li, J. (2021). Fostering trust: Authoritarian, benevolent, and moral paternalistic leadership styles and the coach–athlete relationship. *Social Behavior and Personality: An International Journal*, *49*(12), 1–11. <https://doi.org/10.2224/sbp.10452>
- Little, R. J. A., & Rubin, D. B. (1989). The analysis of social science data with missing values. *Sociological Methods & Research*, *18*(2–3), 292–326. <https://doi.org/10.1177/0049124189018002004>
- Meins, E., McCarthy-Jones, S., Fernyhough, C., Lewis, G., Bentall, R. P., & Alloy, L. B. (2012). Assessing negative cognitive style: Development and validation of a short-form version of the cognitive style questionnaire. *Personality and Individual Differences*, *52*(5–2), 581–585. <https://doi.org/10.1016/j.paid.2011.11.026>
- Merton, R. K. (2005). The sociology of knowledge. In Nico Stehr (Ed.), *Society and knowledge* (2nd ed.). Routledge.
- Mohit, H., Chaitanya, K., Kumar, M., B., K., & Shanthakumara, A. H. (2024). Effortless meeting analysis automation. *Grnze International Journal of Engineering & Technology*, *10*(2, Part 2), 1563.
- Moran, K. J. (2023). *The Doctor of Nursing Practice Project: A Framework for Success*. Jones & Bartlett Learning.
- Muralidharan, E., & Pathak, S. (2019). Consequences of cultural leadership styles for social entrepreneurship: A theoretical framework. *Sustainability*, *11*(4), 965. <https://doi.org/10.3390/su11040965>
- Nauman, S., Bhatti, S. H., Imam, H., & Khan, M. S. (2022). How servant leadership drives project team performance through collaborative culture and knowledge sharing. *Project Management Journal*, *53*(1), 17–32. <https://doi.org/10.1177/87569728211037777>
- Nosek, B. A., Hawkins, C. B., & Frazier, R. S. (2011). Implicit social cognition: From measures to mechanisms. *Trends in Cognitive Sciences*, *15*(4), 152–159. <https://doi.org/10.1016/j.tics.2011.01.005>
- Patent, V. (2022). Dysfunctional trusting and distrusting: Integrating trust and bias perspectives. *Journal of Trust Research*, *12*(1), 66–93. <https://doi.org/10.1080/21515581.2022.2113887>

- Pearse, R., Hitchcock, J. N., & Keane, H. (2019). Gender, inter/disciplinarity and marginality in the social sciences and humanities: A comparison of six disciplines. *Women's Studies International Forum*, 72, 109–126. <https://doi.org/10.1016/j.wsif.2018.05.007>
- Sadler-Smith, E., Spicer, D. P., & Tsang, F. (2000). Validity of the cognitive style index: Replication and extension. *British Journal of Management*, 11(2), 175–181. <https://doi.org/10.1111/1467-8551.t01-1-00159>
- Seashore, K., Leithwood, K., Wahlstrom, K., & Anderson, S. (2010). Investigating the links to improved student learning: Final report of research findings. <https://hdl.handle.net/11299/140885>
- Seemiller, C., & Whitney, R. (2020). Creating a taxonomy of leadership competency development. *Journal of Leadership Education*, 19(1), 119–132. <https://doi.org/10.12806/V19/I1/R5>
- Simon, J. (2020). *The Routledge handbook of trust and philosophy*. Routledge.
- Uzzi, B., Yang, Y., Tian, T. Y., Woodruff, T. K., Jones, B. F., & Uzzi, B. (2022). Gender-diverse teams produce more novel and higher-impact scientific ideas. *Proceedings of the National Academy of Sciences*, 119(36), e2200841119. <https://doi.org/10.1073/pnas.2200841119>
- Wang, Y., Cao, H., Xu, F., & Wang, J. (2021). The influence of educational trust on the willingness of engineering undergraduates to participate in academic competition. *International Journal of Engineering Education*, 37(4), 874–883.
- Xu, X. (2021). A policy trajectory analysis of the internationalisation of Chinese humanities and social sciences research (1978–2020). *International Journal of Educational Development*, 84, 102425. <https://doi.org/10.1016/j.ijedudev.2021.102425>
- Xu, X., Oancea, A., & Rose, H. (2021). The impacts of incentives for international publications on research cultures in Chinese humanities and social sciences. *Minerva*, 59(4), 469–492.
- Youngwerth, J., & Twaddle, M. (2011). Cultures of interdisciplinary teams: How to foster good dynamics. *Journal of Palliative Medicine*, 14(5), 650–654. <https://doi.org/10.1089/jpm.2010.0395>

- Yudiatmaja, W. E., Salomo, R. V., & Prasajo, E. (2023). Fostering innovative behavior of millennial public employee through leadership styles and organizational trust. *Sage Open*, 13(2), 21582440231178545. <https://doi.org/10.1177/21582440231178545>
- Zhao, D., Chen, Z., Berghorn, G., Shu, L., & Asiedu-Kwakyewaa, C. (2025). Structural leadership improves student engagement in collaboration. *Journal of Civil Engineering Education*, 151(1), 04024005. <https://doi.org/10.1061/JCEECD.EIENG-2027>
- Zhe, C., Lu, X., & Xiong, X. (2021). Analysis of influence factors on the quality of international collaboration research in the field of social sciences and humanities: The case of chinese world class universities (2015–2019). *SAGE Open*, 11. <https://doi.org/10.1177/21582440211050381>