Leadership & Organization Development Journal



# From vertical to horizontal leadership: changing leadership structure schemas through experiential learning

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Received 25 March 2025
Revised 19 September 2025
17 December 2025
Accepted 22 January 2026

## Abstract

**Purpose** – Leadership is often understood as enacted within hierarchical structures, yet modern organizations increasingly rely on plural leadership. A critical but underexplored question is whether individuals' leadership structure schemas (LSS) – the cognitive templates about how leadership is organized – are malleable. This study aims to investigate whether experiential learning can shift those schemas from vertical to more horizontal.

**Design/methodology/approach** – We conducted a quasi-experimental longitudinal field study using a repeated pretest–posttest design with nonequivalent cohorts. Master of Business Administration students ($N = 115$; three cohorts) participated in a case-based experiential session. LSS was measured at four waves. Analyses examined within-person change and leveraged the cohorts' staggered timing to provide nonequivalent comparisons.

**Findings** – Results show within-person shifts toward more horizontal LSS immediately after the session that remained three months later. Between-cohort analyses indicated that the earlier intervention cohort displayed significantly stronger schema change than the comparison cohorts, which showed no change. Change magnitude was also associated with higher perceived case quality, consistent with the role of engaging, discrepant information in schema revision.

**Practical implications** – When organizations implement horizontal leadership structures, experiential learning can help prepare employees by supporting changes in their LSS.

**Originality/value** – We provide field evidence of LSS malleability and demonstrate how experiential case-based learning can cultivate receptivity to horizontal leadership.

**Keywords** Leadership schemas, Leadership learning and development, Leadership training and development, Leadership-structure schemas

**Paper type** Research article

Most leadership frameworks assume a hierarchy (Dinh *et al.*, 2014), reflecting our tendency to conceptualize power relations vertically in space (Giessner and Schubert, 2019; Schubert, 2005). Yet organizations increasingly rely on diverse workforces tackling complex tasks. (Di Battista *et al.*, 2025). In such contexts, hierarchical leadership structures may be limiting because they place the burden of leadership on a single person (Reitzig and Heiss, 2025) and therefore risk underutilizing employees' collective expertise (van Knippenberg *et al.*, 2020). In response, scholars have advanced approaches to leadership "in the plural" (Denis *et al.*, 2012; see also Bolden, 2011), emphasizing more horizontal structures in which influence is shared among multiple leaders.

Whether such approaches can be established, however, depends not only on structures and practices but also on how individuals *mentally represent* leadership. Research suggests that team members hold leadership structure schemas (LSS) [1] – cognitive models of what a prototypical leadership structure looks like – that vary in their orientation toward vertical versus horizontal arrangements (DeRue and Ashford, 2010). When LSS is more horizontal, teams show greater receptiveness to shared leadership and more positive reactions to



Leadership & Organization Development Journal
Vol. 47 No. 9, 2026
pp. 1-13
Emerald Publishing Limited
e-ISSN: 1472-5347
p-ISSN: 0143-7739
DOI 10.1108/LODJ-03-2025-0217

reciprocal influence attempts (Wellman *et al.*, 2022). This highlights LSS as a key psychological foundation for whether plural leadership can take root.

A critical gap, however, remains: Are LSS malleable? According to schema theory (Lipman, 1991; Rumelhart, 1984), schemata are "organized knowledge structures representing concepts such as situations, objects, events, and actions at various levels of abstractness" (Schützwohl, 1998, p. 1183). While dynamic, they are also resistant to change because they filter incoming knowledge through existing expectations. Moreover, humans appear inclined to think hierarchically about leadership, with evolutionary roots (Fiske, 1992; Giessner and Schubert, 2019). Thus, it is far from clear whether horizontal LSS can be cultivated through leadership development efforts.

This is particularly relevant in the context of business schools, which play a central role in preparing future leaders. Yet leadership development in these institutions has been criticized for not walking its evidence-based talk, often relying on practices insufficiently grounded in theory or empirical evaluation (Leroy *et al.*, 2022). Answering the question of whether fundamental cognitive representations of leadership can be changed would therefore not only advance theory but also directly inform more rigorous, evidence-based approaches to leadership education. The present research addresses this gap. We designed an experiential teaching case in a team sport context, followed by a structured discussion, to expose Master of Business Administration (MBA) students to discrepant information about plural leadership (Mulder and Giessner, 2022). Drawing on schema theory (Lipman, 1991; Rumelhart, 1984), we argue that such experiential learning (Kolb, 2014) is particularly suited to enabling conceptual change (Schützwohl, 1998).

In sum, we make two contributions. First, we test whether LSS is malleable, thereby identifying a psychological lever for fostering plural leadership. Second, we respond to calls for more evidence-based leadership development (Leroy *et al.*, 2022) by providing empirical insight into how theoretically grounded interventions can shape the mental models of future leaders. We further show that perceived quality of the intervention influences schema change, highlighting the potential role of transmission quality in enabling schema change (Reynolds *et al.*, 1996).

## Theoretical framework

Over the past decades, business environments have become increasingly complex due to the shifting consumer demands, digitalization, global supply chains, changing workforce expectations, and macroeconomic developments. This complex has reshaped employees' and leaders' roles, often requiring collaboration through shared responsibilities (Uhl-Bien *et al.*, 2007). Diverging from classical leadership frameworks, academics and practitioners have therefore emphasized "leadership in the plural" – implying more than one person leading a team or organization – as a way of addressing these challenges (Denis *et al.*, 2012).

Plural leadership can take different forms, such as shared (Pearce *et al.*, 2008), distributed (Gronn, 2002), or collective leadership (Friedrich *et al.*, 2009). All imply that leadership functions are exercised by many individuals rather than concentrated in a single leader (Denis *et al.*, 2012). Bolden (2011) reviewed distributed leadership from a perspective emphasizing leadership as a collective, emergent property of groups and organizations rather than an individual attribute. Denis and colleagues (2012) similarly highlight in their review that plural forms of leadership are particularly relevant in complex organizations, where plural leaders interact, sometimes in complementary and sometimes in competing ways. Together, previous work suggests that plural leadership is not a uniform phenomenon but a family of approaches that recognize the distributed, negotiated, and often contested nature of leading in practice.

Plural leadership is not a universal solution but depends on contextual conditions that support it. Research shows that plural leadership is more likely to emerge and be effective in settings characterized by organizational complexity, distributed expertise, and norms of trust and collaboration (Denis *et al.*, 2012; Giessner and Horton, 2023). At the same time, plural

leadership requires individuals to accept that influence can be shared (DeRue and Ashford, 2010). In other words, beyond structural and cultural enablers, the feasibility of plural leadership also depends on team members' LSS – that is, whether they view horizontal rather than vertical arrangements as legitimate and effective. LSS can range from a more hierarchical LSS, characterized by a single top leader, to a more horizontal LSS, in which leadership is shared amongst team members. These are the two most extreme forms of LSS. More hybrid LSS are between these two extremes. Further, recent research shows that individuals with more horizontal LSS not only evaluate plural leadership more positively but also engage in more leadership behaviors themselves, even when formal authority is present (Wellman *et al.*, 2022). This suggests that horizontal LSS may be essential for effective plural leadership. What remains unclear, however, is whether such schemas can be changed.

Schema theory provides the theoretical grounding for this question (Lipman, 1991; Rumelhart, 1984). Schemas are organized knowledge structures that guide how individuals interpret events, actions, and situations. They include declarative (what) and procedural (how) knowledge. While schemas are dynamic because they change with new information and experiences, they also guide how we see the world and what information we consider or ignore. This can create a feedback loop whereby we perceive what we expect to perceive (Lipman, 1991). Therefore, despite the dynamic nature of schemas, change may take time, especially when schemas already possess a well-developed cognitive structure (Schützwohl, 1998).

Leadership is strongly associated with verticality in human cognition: power is intuitively understood as "up" and powerless as "down," with roots in both evolutionary adaptation and social learning (Giessner and Schubert, 2019; Schubert, 2005). Research shows that people cannot entirely suppress this vertical–power association even when explicitly instructed to do so (Schubert *et al.*, 2009). Such findings highlight the robustness of leadership schemas and raise doubts about whether individuals can easily shift their vertical toward a more horizontal schema. Furthermore, Wellman and colleagues (2022) argued that LSS can be understood as more specific versions of a cognitive model of social relations (Fiske, 1992). A vertical LSS is part of an authority ranking relational model that organizes interactions between superiors and subordinates, mapping neatly onto hierarchical leadership structures. Because authority ranking is a universal and cognitively efficient way of structuring relations, it provides a natural template for understanding leadership. Moreover, authority ranking has been deeply institutionalized in cultural practices, organizations, and family structures, making hierarchical schemas emotionally resonant and socially legitimate (Reitzig and Heiss, 2025). In contrast, a horizontal LSS can be seen as a specific form of communal sharing relational model in which the focus is on community, belonging, and sharing rather than leadership in itself (Fiske, 1992).

Together, verticality biases and authority-ranking dynamics suggest that hierarchical leadership schemas are not merely conventions but reflect deeply ingrained cognitive frames, which makes them especially resistant to change. However, the literature provides little direct evidence on whether LSS are immutable. It therefore remains an open empirical question whether such deeply rooted cognitive frames can be shifted through targeted developmental experiences, or whether they operate as relatively fixed constraints on how individuals perceive and enact leadership.

Schema theory (Lipman, 1991; Rumelhart, 1984) highlights the conditions under which such schemas may change. Discrepant and surprising information can prevent the incorporation into an existing schema and increase the likelihood of schema revision (Schützwohl, 1998). This is because a schema-discrepant event is increasingly challenging to integrate into a schema, eliciting a process of sensemaking (Sala *et al.*, 2026) and, therefore, making it more likely to alter the schema itself. Timperley and Robinson (2001) identified three critical conditions for schema revision. The first one is the salience of discrepant data. If data tells an opposite story, this will trigger the thinking of changing the schema. The second is external support to analyze and interpret the data. Finally, the third condition is to have

alternative schemas. This creates a theoretical tension at the heart of our study: Are LSS so deeply embedded that they remain fixed, or can they be changed through targeted interventions? Addressing this tension is crucial for understanding whether plural leadership can be psychologically sustained and whether leadership development can influence the cognitive foundations of how people view leadership (cf. DeRue and Ashford, 2010).

## 4

*Changing LSS with experiential teaching*

Experiential learning approaches provide the conditions under which schema change is most likely to occur (Steffe and Thompson, 2000). Such methods enable students to build a direct connection between theoretical frameworks and real-life practices (Kolb, 2014). By engaging students in experiences that expose them to discrepant information, experiential learning increases the element of surprise and salience, thereby enhancing the likelihood of schema revision (Schützwohl, 1998). In line with Timperley and Robinson (2001), discrepant information becomes more prominent, and an alternative storyline with a new schema is introduced. Because this new information is delivered engagingly and unexpectedly, it is harder to assimilate into existing schemas and thus more likely to prompt change (Sala *et al.*, 2026). Moreover, the teacher plays a critical role in guiding students' analysis and interpretation of the case and its underlying message. Consequently, these features of experimental teaching may help to shift LSS from vertical to horizontal.

One prominent form of experimental teaching is case-based learning. This method is often considered more effective than conventional lecture-based teaching in stimulating students' critical thinking because it requires students to analyze real-life problems and make decisions based on limited information (Kim *et al.*, 2006). According to Kim and colleagues, an inspiring case that supports experiential learning needs to be (1) relevant, (2) realistic, (3) engaging, (4) challenging, and (5) instructional. These attributes closely align with the conditions identified as necessary for schema revision (Timperley and Robinson, 2001; Schützwohl, 1998). Furthermore, discrepant information delivered in a positive, engaging manner elicits exploratory sensemaking, thereby increasing the willingness to change schemas (Sala *et al.*, 2026). Exploratory sensemaking entails a deliberate effort to gather further information, entertain multiple possible interpretations, and use the situation as an opportunity to extend or revise existing understandings (Maitlis *et al.*, 2013). Consequently, students' perceived (positive) quality of the intervention should also impact the degree of schema change: the higher the perceived quality, the greater its potential to trigger schema change. These considerations are critical given that vertical LSS may be deeply embedded (Reitzig and Heiss, 2025) and evolutionarily driven (Giessner and Schubert, 2019) and therefore potentially difficult to change (cf. Schubert *et al.*, 2009).

Although case teaching is widely used in business schools and beyond, surprisingly little research has examined its impact. A recent meta-analysis of 15 studies in psychology courses found that case teaching improved student grades (Wu *et al.*, 2023). Another meta-analysis of 19 studies indicated that the method enhanced student motivation (Wijnia *et al.*, 2024). Extending this research, we argue that it also creates conditions for schema revision.

In our study, we specifically aim to shift individuals' LSS from more vertical to more horizontal (cf. Wellman *et al.*, 2022). As argued above, a case that presents disconfirming information about leadership structures, combined with teacher-facilitated student discussion, should support schema revision. Our case introduces an alternative perspective by presenting a successful example of plural leadership, offering space for reflection and discussion. Consequently, we argue that such a case-based learning enables a shift in LSS from vertical to horizontal. Importantly, we predict that these schema shifts are not limited to short-term demand effects immediately after class but will persist over a longer period. To test this, we examined whether changes were present directly after the session and remained visible three months later.

*H1*. A case-based teaching intervention specifically designed to challenge vertical conceptions of leadership will shift LSS toward a more horizontal orientation, with changes evident immediately after the class and sustained three months later.

Students may differ in their perceptions of the quality of case-based teaching (Kim *et al*., 2006). A higher-quality experience is more likely to elicit recognition of discrepant information and to support the adoption of an alternative schema (Timperley and Robinson, 2001). From a schema-theoretic perspective, perceived quality shapes the extent to which students treat the case as sufficiently credible, meaningful, and worth engaging with—conditions that increase the positive experience associated with the discrepant cues. This is assumed to result in deeper exploratory sensemaking and, ultimately, schema adjustment (Sala *et al*., 2026). Accordingly, variation in students' perceptions of quality should influence the extent to which case-based learning fosters schema revision. In our context, this implies that the intervention's effectiveness in shifting LSS from vertical to horizontal will be more substantial for students who perceive the case as high in quality.

*H2*. Perceived quality of the case-based teaching intervention will moderate schema change, such that higher quality perceptions are associated with stronger shifts in LSS from vertical to horizontal.

## Method

### *Experiential case study*

We developed a case on plural leadership (Mulder and Giessner, 2022), designed to integrate theoretical insights through an adaptive, active-learning approach grounded in case-based learning principles (Kim *et al*., 2006). A professional case development department supported its development. By actively engaging with the case, the students could explore both practical and theoretical insights about plural leadership (Denis *et al*., 2012).

The case is designed according to Kim and colleagues' (2006) principles, who argue that a high-quality case must be relevant, realistic, engaging, challenging, and instructional. The case concerns a National Field Hockey Team spanning the 2016 to the 2021 Olympic Games. First, in preparation for the session, students watched videos to learn what field hockey is. The case consists of four parts, in which students, for each part, read the text and then answer questions about how they would approach, act, or react to events in the case. In other words, they step into the lead character's shoes and view the case through the lead actor's eyes (i.e. a consultant supporting this team). Thus, this should increase learning through experience (Kolb, 2014).

In the first two parts, the case highlights problems of group functioning—members acting as individuals, ineffective rituals, and suboptimal leadership. Part three then raises the question of the most suitable leadership structure. While it does not prescribe plural leadership as the only solution, it introduces this possibility, and in reality, the team adopted such an approach. This sets the stage for student discussion of the conditions, advantages, and drawbacks of having plural leadership. The debate provides discrepant perspectives on leadership, fostering critical reflection and potential schema change (Timperley and Robinson, 2001).

### *Participants*

A total of 115 students participated in the study. The sample comprised 60 women and 55 men, with an average age of 30.55 years (*standard deviation (SD)* = 3.27). Of those, not all agreed to use their data at all time points (i.e. 108 agreed at T0, 109 at T1, 84 at T2, and 105 at T3).

### *Procedure*

We employed a quasi-experimental longitudinal field design with four measurement waves and three non-randomized groups. The study was embedded in an MBA Organizational Behavior course comprising 10 three-hour sessions, with the intervention delivered in session

8. The MBA cohort was divided into three class sections (during the whole study year), and the case was therefore taught three times by the same instructors (i.e. first two authors). Each session began directly with the case, which was used up to part three, because this part introduces the discussion of plural leadership. After each part, student teams discussed the case questions for about 20 min. A few teams presented their ideas, and the points were further explored in the plenary session. Subsequently, a short interactive lecture (30 min) on plural leadership followed. To evaluate schema change, students completed surveys across four waves (two pre- and post-intervention). Importantly, the timing of the intervention differed between groups: Section 1 received the session five days before Sections 2 and 3, and on the intervention day, Section 2 was taught in the morning and Section 3 in the afternoon. This staggered design provided both (a) repeated measures within participants and (b) allowed the later-taught sections to serve as quasi-experimental comparisons, strengthening our ability to link changes in LSS to the intervention.

*Measures*

For all measures, we used Likert scales ranging from 1 (strongly disagree) to 7 (strongly agree).

*LSS*. We measured LSS using the 5-item scale developed by Wellman and colleagues (2022; e.g. "Groups work best when leadership is shared among multiple group members"), administered at four time points. The first measurement (T0) occurred about two weeks before the intervention as part of a course-related leadership survey; students did not receive feedback on this measure. The second (T1) was at the beginning of the session, the third (T2) at the end of the session, and the fourth (T3) approximately three months later. At T0 and T3, students indicated whether their data could be used for research. Only those who consented were included. At T1 and T2, students were informed that the survey was part of a case evaluation, participation was voluntary, and they could withdraw at any time.

*Knowledge about plural leadership*. We measured this with two items (e.g. "I know what multiple leadership is about"). This measure was captured before the session (T1) and after the session (T2) [2].

*Perceived case quality*. Finally, we included a self-developed 6-item scale, based on the five case quality dimensions outlined by Kim and colleagues (2006; i.e. relevant, realistic, engaging, challenging, and instructional). To capture the instructional dimension, we used two items ("The case helps to understand multiple leadership"; "The case is well explained"; other items: "The case is engaging; The case is realistic; The case is relevant; The case is challenging") at T2.

## Results

Table 1 reports correlations, reliabilities, means, and standard deviations. All anonymized data and syntax are available on the Open Science Framework (OSF) website at https://osf.io/q8btx/?view_only=e54ff6c0578d455c86c677d1ab90bd00. Our scale on perceived case quality showed good reliability, and an exploratory factor analysis indicated a one-factor solution, accounting for 59.94% of the variance.

To assess whether attrition introduced systematic bias into our analyses, we followed Goodman and Blum's (1996) recommendations and tested for non-random sampling using multiple logistic regressions. For each test, we created a dichotomous dependent variable distinguishing *stayers* (participants who responded at both T0 and T1 in analysis 1, at both T1 and T2 in analysis 2, or at both T2 and T3 in analysis 3) from *leavers* (participants who responded only at T0 in analysis 1, only at T1 in analysis 2, or only at T2 in analysis 3). The independent variable was LSS: T0 in analysis 1, T1 in analysis 2, and T2 in analysis 3.

In analysis 1, T0 LSS was non-significant, $b = -0.19$, *standard error (SE)* $= 0.36$, $p = 0.60$. Likewise, analysis 2 yielded a non-significant effect for T1 LSS, $b = 0.14$,

**Table 1.** Correlation table

| | M | SD | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|---|---|
| (1) LSS T0 | 3.68 | 1.20 | (0.82) | | | | | | | |
| (2) LSS T1 | 3.63 | 0.96 | 0.64*** | (0.76) | | | | | | |
| (3) LSS T2 | 4.33 | 0.80 | 0.57*** | 0.58*** | (0.62) | | | | | |
| (4) LSS T3 | 4.43 | 1.18 | 0.33** | 0.47*** | 0.57*** | (0.80) | | | | |
| (5) Knowledge T1 | 3.98 | 1.33 | 0.10 | 0.38*** | 0.03 | 0.22* | (0.82) | | | |
| (6) Knowledge T2 | 5.62 | 0.88 | 0.19 | 0.26* | 0.40*** | 0.35** | 0.13 | (0.77) | | |
| (7) Case quality T2 | 5.95 | 0.82 | −0.10 | −0.10 | 0.14 | 0.04 | −0.07 | 0.41*** | (0.86) | |
| (8) Gender | 1.43 | 0.50 | 0.01 | 0.01 | 0.07 | −0.01 | 0.05 | 0.05 | −0.08 | |
| (9) Age | 30.55 | 3.27 | −0.11 | −0.03 | −0.01 | −0.14 | 0.14 | −0.20 | −0.06 | −0.07 |

**Note(s):** *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; Gender (1 = Male, 2 = Female); T0 = 2 weeks prior session, T1 = beginning of the session; T2 = end of session, T3 = 3 month after the session, LSS = Leader Structural Schema, All scales range from 1 to 7. Statistics are based on the largest available number of participants

$SE = 0.24$, $p = 0.54$, and analysis 3 yielded a non-significant effect for T2 LSS, $b = -1.24$, $SE = 0.66$, $p = 0.06$. Taken together, these results suggest that attrition was random with respect to LSS.

To test H1, we first examined changes in LSS over time using mixed-measures ANOVA across all four measurement waves (T0–T3) and the three sections. This allowed us to test overall within-person changes and differences between sections that received the intervention at different times.

In a second step, we leveraged the staggered design to approximate a switching replications design (Bell, 2010), providing an additional test of H1. Here, the first class section was coded as intervention group A, and the two subsequent sections as intervention group B. T0 was used as the common baseline for all sections (Tbase). For the intervention group A, T2 (after their session) served as the first post-test, whereas for the intervention group B, T1 (which occurred after the intervention group's session but before their own) served as the first post-test (Tpost1). T3 served as a second post-test for all (Tpost2). Because the intervention group B received the intervention between Tpost1 and Tpost2, this design enabled us to test whether observed changes were consistent with the effects of the intervention rather than with temporal or testing effects.

Our approach improves upon the classic single pretest–posttest setup (Campbell and Stanley, 1966; Bell, 2010) by incorporating multiple pre- and post-measures, by controlling for group differences, and by providing both within-group and between-group comparisons. This allows us to assess baseline stability, track post-intervention change, and partially control for time-related confounds, thereby addressing important validity concerns.

This results of the first analysis yielded a significant effect of LSS over time, $F(3, 210) = 24.99$, $p < 0.001$, $\eta_p^2 = 0.26$. Pairwise comparisons show that there was no significant difference in LSS between T0 and T1, $M^{diff} = -0.12$, $SE = 0.11$, $p > 0.99$. However, after the training at T2, LSS shifted significantly more towards a horizontal perspective when compared to T1, $M^{diff} = 0.67$, $SE = 0.10$, $p < 0.001$, and T0, $M^{diff} = 0.79$, $SE = 0.13$, $p < 0.001$. In other words, between 2 weeks before and the start of the training, there was no change in LSS, but after the training, participants shifted towards a more horizontal *LSS*. This change remained stable even 3 months after the intervention because there was no significant difference between T2 and T3 ($M^{diff} = 0.13$, $SE = 0.12$, $p > 0.99$), and T3 differed significantly from T0 ($M^{diff} = 0.92$, $SE = 0.17$, $p < 0.001$) and T1 ($M^{diff} = 0.80$, $SE = 0.14$, $p < 0.001$). There was again no main effect of the *section*, $F(2,70) = 0.02$, $p = 0.98$, $\eta_p^2 = 0.001$, nor an interaction effect, $F(6, 210) = 0.42$, $p = 0.87$, $\eta_p^2 = 0.01$. Figure 1 visualizes these results.

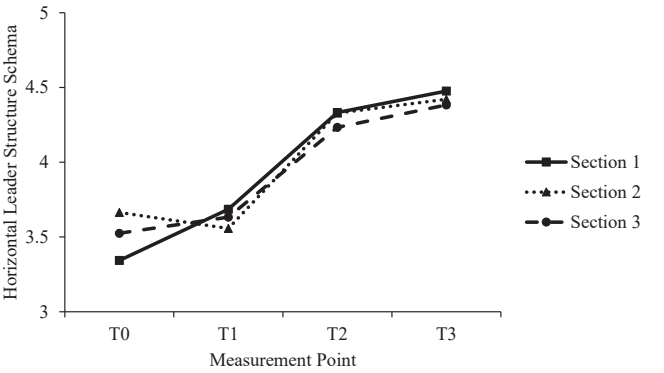


**Figure 1.** Changes in LSS over time. *Note*. T0 = 2 weeks prior session, T1 = beginning of session; T2 = end of session; T3 = 3 months after the session; Sections 1,2 and 3 represent the MBA sections participating; scale ranges from 1 to 7

The result of our second mixed-model ANOVA (i.e. switching replications design) yielded a significant effect of LSS over time, $F(2, 154) = 22.08$, $p < 0.001$, $\eta_p^2 = 0.22$, and the expected interaction between time and intervention group, $F(2, 154) = 6.42$, $p = 0.002$, $\eta_p^2 = 0.08$. The only significant difference between the intervention groups is at Tpost1, $F(1, 77) = 7.46$, $p = 0.008$, $\eta_p^2 = 0.09$, when intervention group A received the intervention and B not yet. Figure 2 shows the results visually. In sum, both analyses support our H1.

Finally, to test H2, we used the MEMORE-Macro to assess moderation in repeated-measures designs (Montoya and Hayes, 2017). We used Model 2 to test the moderation of case quality (T2) on the relationship between *LSS* at T1 and LSS at T2. We included the section again as a second moderator as a control and tested for significance with bootstrapping. The analysis yielded only a significant effect of case quality on the changes in *LSS* between T1 and T2, *effect* = 0.25, *SE* = 0.11, *95% confidence interval (CI)* (0.04, 0.47). Looking at 1 SD above and below the mean of *perceived case quality*, LSS increased stronger towards a horizontal if the case was more positively pereceived, *effect* = 0.87, *SE* = 0.12, *95% CI* (0.62, 1.12), compared to a lower quality perceptions, *effect* = 0.45, *SE* = 0.12, *95% CI* (0.20, 0.70), supporting H2.

## Discussion

Using an experiential case-teaching approach, we show that students shifted their LSS from a more vertical to a more horizontal orientation. In other words, we provide evidence of schema revision and thus support hypothesis 1. Furthermore, schema revision was more substantial among students who perceived the case as higher in quality, supporting hypothesis 2. This interaction effect supports recent theorizing that positive divergent information is essential for triggering explorative sensemaking, thereby increasing the likelihood of schema change (Sala *et al.*, 2026).

### *Theoretical and practical implications*

Our research contributes to the literature on schema theory (Lipman, 1991; Rumelhart, 1984) and especially on schema revision (Schützwohl, 1998; Sala *et al.*, 2026). We demonstrate that a case-based experimental learning approach is well suited to foster schema change, because it provides surprising and discrepant information engagingly (Timperley and Robinson, 2001). We observed shifts LSS with most substantial effects among those students perceiving a high-quality case. These findings show that providing an engaging case with divergent information, combined with a guided discussion, can help revise schemas.

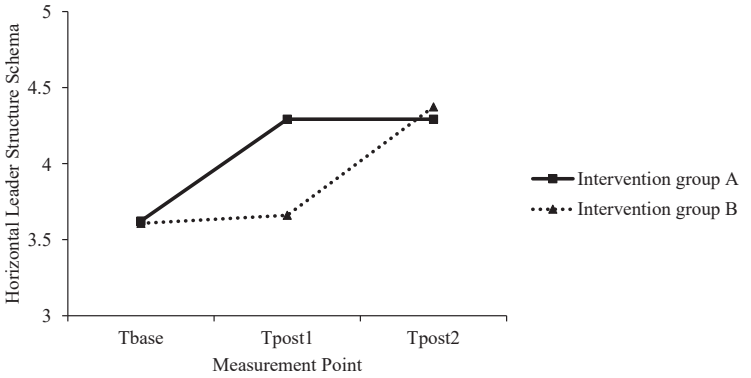


**Figure 2.** Non-equivalent pretest-posttest control group design. *Note*. Tbase = 2 weeks prior session, Tpost1 = post-intervetion for group A, pre intervention for group B; Tpost2 = 3 months after the intervention for both groups; scale ranges from 1 to 7

This is important for two reasons. First, while prior research has suggested that a hierarchical schema may be a deeply rooted leadership schema (Fiske, 1992; Giessner and Schubert, 2019) and, therefore, hard to change (Schubert *et al.*, 2009), our results indicate that such schemas are in fact malleable, even over a relatively short period, when interventions are designed in line with schema theory prinicples (Reynolds *et al.*, 1996) More precisely, LSS are changeable if discrepant information is provided engagingly (Schützwohl, 1998), eliciting a positive surprise which stimulates exploratory sensemaking (Sala *et al.*, 2026). In particular, the moderating effect of case quality perceptions underscores the importance of a positive surprise experience as a necessary condition for schema change.

Second, our findings shed light on how organizations can prepare teams for plural leadership. Although research has highlighted the potential effectiveness of plural leadership (Bolden, 2011; Dennis *et al.*, 2012), less is known about the conditions under which it can flourish. Given that a more horizontal LSS has been linked to more effective leadership outcomes in settings requiring plural leadership (Wellmann *et al.*, 2022), this underscores the practical relevance of fostering schema change. Our research establishes that shifting LSS from vertical to horizontal is a feasible approach to establishing behavioral readiness for plural leadership in practice.

Our study also addresses a recent call to establish more evidence-based leadership development (Leroy *et al.*, 2022). By demonstrating that a theoretically grounded, case-based experiential intervention can shift LSS, we respond to this call and provide empirical evidence that leadership development can and should be designed on a stronger evidence base (see supplement for case design guidelines). Consequently, our findings yield practical insights for designing leadership education interventions to foster schema change. Effective programs should introduce salient discrepant information by presenting concrete examples that challenge the assumed inevitability of hierarchical leadership structures. To be impactful, such examples need to be realistic, emotionally engaging, and grounded in credible practice, increasing the likelihood that discrepant cues are noticed rather than dismissed. Schema revision is further supported when learners are guided in interpreting these discrepancies (Timperley and Robinson, 2001) and when instructional materials are delivered positively and engagingly (Sala *et al.*, 2026). Consistent with this view, the moderating role of perceived case quality in our study underscores the importance of emphasizing relevance, realism, challenge, engagement, and instructional clarity in educational design (Kim *et al.*, 2006). In addition, interventions should provide a coherent and legitimate alternative schema—here, horizontal leadership—rather than merely destabilizing existing assumptions, in line with schema theory's emphasis on viable replacement models for accommodation (Rumelhart, 1984). Finally, although the changes in LSS persisted for three months, we still recommend that leadership education programs further strengthen learning outcomes by incorporating follow-up activities, such as reflective exercises or peer discussions (cf. Chi, 2009), to consolidate newly developed schemas over time.

Although our study focuses on MBA students at business schools, the ability to shift LSS has broader societal relevance. Traditional hierarchical schemas not only shape organizational practices but also influence how individuals understand authority and social coordination more generally (Reitzig and Heiss, 2025). As work becomes increasingly diverse (Van Knippenberg *et al.*, 2020), societies may benefit from cognitive models that view leadership as a shared, relational, and context-dependent process rather than as the property of a single individual. Demonstrating that LSS is malleable suggests that a more horizontal leadership mindset can be cultivated through educational systems, professional development, and training. In turn, this may support more inclusive decision-making, reduce overreliance on individual leaders, and foster collaborative problem-solving in complex societal contexts.

### *Limitations and future research directions*

As with any research, our study is not without limitations. First, we relied on a single teaching method and one self-developed teaching case. While it is plausible that other experiential

teaching methods or cases may also enable schema revision, our findings cannot be generalized across different approaches. However, a strength of our research is the finding that perceived case quality moderates schema revision. This result provides broader confidence that the features of high-quality cases (i.e. relevance, realism, engagement, challenge, and instructional value) are essential in schema revision (Kim *et al.*, 2006; Timperley and Robinson, 2001). Nevertheless, the measure of perceived case quality was not fully established and warrants further validation in future research. Furthermore, while MBA students can be seen as emerging leaders, our results cannot be generalized immediately to other populations (e.g. experienced leaders) or to other leader development programs. Therefore, future research may address the generalizability of our results.

Second, although our quasi-experimental design was strengthened by the inclusion of two pre-tests and two post-tests, as well as by the use of staggered intervention groups (i.e. to make use of a switching replication design in our analysis), allowing us to address major validity concerns of a simple pretest-posttest design (Bell, 2010), it still comes with inherent limitations. Our design does not provide the same level of causal inference as a randomized controlled trial. Thus, we cannot entirely exclude the effects of third variables. However, the interaction effect with perceived case quality provides some evidence that the quality of the intervention method matters for schema revision.

Third, our study relied exclusively on quantitative survey data. While these data capture shifts in LSS, qualitative insights could have enriched our understanding of the underlying mechanisms of change. Incorporating qualitative methods would therefore be a valuable avenue for future research.

Third, we do not know precisely how long-lasting these changes in LSS are. Nevertheless, given that we can show the stability of the change three months after the intervention, we can provide at least evidence that the change has longer-lasting effects.

Finally, future research might examine boundary conditions, such as whether learner characteristics (e.g. reflective learning orientation or prior leadership experience) influence schema change. In addition, a systematic manipulation of case features (e.g. realism, engagement, complexity) would clarify which aspects most strongly drive schema revision.

## Conclusion

In sum, our study demonstrates that LSS (DeRue and Ashford, 2010), often assumed to be rigid and hierarchical, can be shifted toward a more horizontal orientation through case-based experiential learning. By showing that schema change is possible and moderated by perceptions of case quality, we highlight both the theoretical malleability of LSS and the practical means of preparing teams for leadership in the plural (Denis *et al.*, 2012). In doing so, we not only extend schema theory and plural leadership research but also respond to calls for more evidence-based leadership development in business schools (Leroy *et al.*, 2022).

### Notes

1. LSS differ from leadership identity, which reflects the integration of the leader role into one's self-concept (Hiller *et al.*, 2006), and from leadership attributions, referring to how individuals *explain* leadership outcomes (Meindl *et al.*, 1985).
2. Hypothesis and results are reported in the online supplement: https://osf.io/q8btx/?view_only=e54ff6c0578d455c86c677d1ab90bd00.

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