

Burnout and leadership in special education: A sustainable approach through the Lens of SDG 3 and SDG 4

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ABSTRACT

Burnout is a critical challenge for special education teachers, undermining teacher well-being and educational quality. This study examines how transformational leadership in special education influences teacher burnout (termed special education work burnout, SEWB) through the mediating pathways of special education teacher admiration and student-centered cognitive empathy (SCCE), and whether these effects depend on teachers' sense of responsibility (SETSR). A quantitative survey was conducted with 439 special education teachers in China. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the hypothesized model. Results indicated that TLSE is significantly associated with lower burnout, and SETA and SCCE partially mediate this relationship. Teachers who admire their institution and leaders report lower burnout, and those with greater cognitive empathy (better understanding of students' perspectives) also experience reduced burnout, supporting both mediation pathways. TLSE had positive effects on both admiration and cognitive empathy, which in turn diminished burnout levels. Additionally, teachers' sense of responsibility moderated the effects: a strong personal responsibility amplified the beneficial impact of TLSE on cognitive empathy and subsequent burnout reduction. These findings suggest that fostering transformational leadership and empathy can alleviate burnout among special educators. The study contributes to understanding teacher well-being in the Chinese context and aligns with global development priorities (SDG 3: Good Health and Well-Being, SDG 4: Quality Education) by highlighting leadership and professional support as keys to sustainable special education. School administrators should cultivate supportive, visionary leadership and provide resources (including empathy training and digital tools) to reduce teacher stress and promote an inclusive, healthy educational environment.

1. Introduction

Special education teachers face high rates of job burnout, characterized by exhaustion, cynicism, and reduced professional efficacy (Park & Shin, 2020). This burnout crisis not only harms individual's mental health (Lei et al., 2025; Peng et al., 2022) but also exacerbates teacher shortages and undermines the quality of education (Lei et al., 2024) for students with special needs (McGrew et al., 2023). In China's expanding special education sector, heavy workloads and increasing demands for inclusive education place teachers at particular risk (Fu et al., 2021). Addressing special educator burnout is therefore critical for achieving the United Nations Sustainable Development Goals (SDG), notably SDG

3 (Good Health and Well-Being) and SDG 4 (Quality Education), by ensuring teacher well-being and retention, which in turn supports quality learning for students with. However, there is a lack of research examining organizational and psychosocial factors that can mitigate burnout among special education teachers, especially in the Chinese context (Ling et al., 2020).

One theoretical lens to understand burnout in this context is the Job Demands-Resources (JD-R) model, which posits that high job demands lead to stress and burnout, whereas adequate resources can buffer these effects (Demerouti et al., 2001). Special education teaching is a demanding profession, managing diverse student needs, paperwork, and emotional labor, so supportive resources are essential (Bettini et al.,

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2023). Transformational leadership is a key organizational resource that may protect teachers from burnout. Transformational leaders provide vision, encouragement, and individualized support, thereby helping teachers cope with intensive demands (Chen et al., 2022). In fact, transformational leadership in schools has been shown to increase teachers' motivation and well-being by fostering a positive, resource-rich work climate (Bryant et al., 2018). This leadership style is especially relevant in modern education, where leaders also leverage digital tools and innovation to support teachers, improve communication, and streamline workloads (Sunu, 2022). In China's special education settings, effective leadership is crucial for navigating reforms toward inclusive education and ensuring teachers feel supported in their challenging roles (Deng & Zhu, 2016; United Nations, 2023).

This study focuses on two social-cognitive resources that transformational leaders may cultivate in teachers: admiration and cognitive empathy. Teacher admiration refers to a positive regard and respect that teachers feel toward their school leadership and institution (Algoe & Haidt, 2009). Transformational leadership often engenders admiration by exhibiting competence, integrity, and inspirational vision (Bass & Riggio, 2006a, 2006b). When teachers admire their leaders, they are more likely to feel valued, trusting, and committed, which can buffer against burnout (Carmeli et al., 2020). Admiration provides teachers with a sense of belonging and pride in their work community, counteracting the emotional exhaustion that leads to burnout. This study therefore expects that teachers' admiration for their leadership will mediate the relationship between transformational leadership and lower burnout.

Cognitive empathy, specifically student-centered cognitive empathy, is the teacher's ability to understand students' thoughts and perspectives (Jiang & Lu, 2020). This faculty is vital in special education, where teachers must interpret and respond to diverse student needs (Trauernicht et al., 2021). Transformational leaders can foster greater cognitive empathy by encouraging perspective-taking, open communication, and an inclusive mindset. When teachers develop higher cognitive empathy, they often experience improved relationships with students and find their work more meaningful, which can reduce stress and burnout (Nwosu et al., 2021). Thus, the study expects cognitive empathy to serve as another mediator through which transformational leadership reduces teacher burnout. By enhancing teachers' ability to cognitively appraise and manage classroom challenges, supportive leaders effectively provide a psychological resource that lessens emotional exhaustion.

In addition, the study considers teachers' sense of responsibility as a potential moderator in the burnout process. Sense of responsibility refers to teachers' personal accountability for their students' outcomes and well-being (Lauermann & Karabenick, 2013). Teachers with a strong sense of responsibility deeply internalize their duty to help every student succeed. This trait can have mixed implications: on one hand, responsible teachers may strive for excellence and respond well to supportive leadership; on the other hand, if organizational support is lacking, their heightened responsibility could translate into pressure and self-blame (Finney, 2019), increasing burnout risk. Prior research suggests that without sufficient support, highly responsible teachers are prone to stress and burnout because they take failures personally (Skaalvik & Skaalvik, 2017). In a positive context, however, transformational leadership might channel teachers' sense of responsibility into constructive efforts (e.g., engaging more in empathy and professional growth). This study anticipates that sense of responsibility may moderate the impact of leadership on burnout and on the mediation pathways. In particular, teachers who feel very responsible might experience the benefits of leadership-facilitated admiration and empathy differently (potentially more intensely) than those with lower responsibility.

Despite mounting interest, burnout scholarship still shows three key gaps. First, most evidence comes from Western samples; Asian contexts such as China, with collectivist norms and hierarchical workplaces

described by Hofstede's cultural dimensions, are rarely examined, leaving culturally specific burnout dynamics under-explored (Hofstede, 2011). Second, research leans on mainstream schooling and overlooks special-education teachers, whose intensified emotional and cognitive load may magnify burnout's damage to pedagogy and learner outcomes (recent study) (Benigno et al., 2025). Evidence on whether transformational leadership counteracts this burnout is still emerging and under-represented in special-education settings (Tian & Guo, 2024). Third, burnout is too often cast as an individual ailment, so organizational antecedents and remedies, including leadership, remain peripheral (Madigan & Kim, 2021).

Our study addresses these gaps through a systemic model that pairs emotional (teacher admiration) and cognitive (empathy) mediators with teacher responsibility as a moderator to predict burnout in special-education settings. By embedding this model in the Sustainable Development Goals, the study highlights how unchecked teacher exhaustion threatens SDG 3 (health and well-being) and SDG 4 (inclusive, quality education), yet leadership-driven, organization-level interventions can advance both targets. This integrative perspective shifts the conversation from individual coping to collective, policy-relevant solutions and clarifies how culturally attuned transformational leadership can sustain teacher well-being and educational quality in high-stress environments.

In summary, this study proposes a model in which transformational leadership reduces special education teacher burnout through two mediators, teacher admiration and cognitive empathy, and where teacher sense of responsibility moderates these relationships. By investigating these mechanisms in China's special education context, the study addresses a critical gap in understanding how school leadership and teacher attributes jointly influence burnout in non-Western, high-demand educational environments (Pavlidou et al., 2022). The research question guiding this work is: How do transformational leadership and the related factors of teacher admiration, cognitive empathy, and sense of responsibility interact to affect job burnout among special education teachers in China? Addressing this question can inform both theory (by integrating social-cognitive factors into burnout models) and practice (by identifying leverage points for interventions to support teacher well-being), thereby contributing to sustainable educational development in line with global goals.

2. Literature review and theoretical underpinning

Burnout is defined as a state of chronic work-related stress marked by emotional exhaustion, depersonalization (cynicism toward people at work), and a reduced sense of personal accomplishment (Ran, 2024). Special education teachers have been found to experience especially high burnout due to the intense emotional and cognitive demands of their role (Fu et al., 2021). They often work with students who have significant disabilities, requiring patience, individualized strategies, and frequent collaboration with families and specialists. These challenges can tax teachers' emotional resources over time. Research internationally and in China underscores that many special educators report moderate to high levels of burnout, which can lead to job dissatisfaction, health problems, and attrition from the profession. Reducing teacher burnout is crucial, as chronic burnout not only impairs teachers' well-being (violating SDG 3 targets on mental health) but also negatively impacts student outcomes and the inclusive education agenda (undermining SDG 4 on quality education).

Leadership plays a very important role in mitigating burnout in many settings. Effective leadership can lower job pressures, improve engagement and help combat burnout. Numerous studies in healthcare, education, and corporate sectors show that leadership styles that promote employee development, support and empowerment are effective in reducing burnout (Chen et al., 2022; Tsang et al., 2022). Leadership behaviors like communication, clear expectations and consistent feedback can significantly reduce the chance of burnout (Maslach & Leiter, 2016), when practiced in the workplace. Ineffective leadership

characterized by lack of support and unclear goals are related to lower burnout rates (Itri & Lawson, 2016). It is very clear that leadership plays an important role in establishing work environment and affecting employee well-being. Transformational leadership in special education refers to school leadership behaviors that inspire, motivate, and intellectually stimulate teachers, while providing individualized support (Gong et al., 2013). A leader who transforms brings a clear vision, values innovation, shows that teachers matter, and helps create a friendly and welcoming school environment. According to research, this way of leading has improved teachers' happiness at work, commitment to the organization, and levels of stress (FLANAGAN, 2022). Transformational leadership plays an important role in burnout situations: it lightens job demands and builds teachers' confidence and sense of support. Thus, a principal who uses transformational leadership could help special education teachers solve issues, offer support, and give them the necessary resources, so they do not feel hopeless or overworked. It has been determined recently that effective and motivating leadership in stressful areas (like special education) helps to reduce teacher burnout. Also, since technology plays a bigger role in education, transformational leaders often manage digital leadership by encouraging and assisting teachers to use technology well. When digital leadership is adopted, there is less need for teachers to handle paperwork, and they can team up more easily using online tools (Sunu, 2022).

This study focuses on the relationship between transformational leadership and burnout in the special education sector. Studies on transformational leadership have shown its capacity to mitigate burnout by fostering an empowering and supportive work environment (Khan et al., 2020). This leadership style is a good way to take away employees' emotional and cognitive burden, thereby reducing the likelihood of burnout (Tian & Guo, 2024). Transformational leaders create shared visions of excellence, which motivate teachers to continue to grow professionally so that they are not likely to become worn out in an already stressful profession. For teachers working to meet many complex demands and stay well (Khan et al., 2020), this leadership is especially important, given the emotionally taxing nature of special education. The study relies on the framework of JD-R theory to explain how leadership influences burnout. JD-R theory defines burnout as a result of 'situation demanding resources more than resources available' (Demerouti et al., 2001). Physical, psychological, and emotional aspects of jobs demanding sustained effort are called job demands, while supports that employees use to cope are called job resources. Transformational leadership serves as a crucial job resource in supplying necessary support, direction, and motivation to keep employees going (Katou et al., 2022), so they can manage high demands without becoming burnt out. This leadership is particularly important in special education, where the demands are especially high, and it is the resources that are necessary to avoid burnout and promote resilience. Based on the JD-R theory and literature on transformational leadership, the study proposes the following hypothesis:

H1. Transformational leadership is negatively related to burnout among special education teachers.

In workplaces, admiration is elicited by leaders who demonstrate competence, integrity, and inspirational qualities (Ahmad et al., 2024). Leaders often cultivate admiration among staff by showing charisma, compassion, and commitment to a shared mission (Helfrich & Dietl, 2019). For special education teachers, feeling admiration for their school leadership can be especially empowering. It signals that the leadership is worthy of trust and emulation, which enhances teachers' emotional connection to their work (Xue et al., 2024). Admiration can thus increase teachers' organizational commitment and morale, as supported by evidence that admiration for leaders correlates with higher employee engagement and well-being. In burnout terms, when teachers genuinely admire their principal or school, they are more likely to perceive a sense of community and shared purpose, which buffers against isolation and cynicism (a core component of burnout).

Admiration also implies that teachers feel valued and inspired in their roles, counteracting the feeling of low personal accomplishment. Therefore, the study expects that admiration is negatively related to burnout: teachers who report greater admiration for their leadership will have lower burnout. Furthermore, the study posits that admiration mediates the effect of leadership on burnout. A strong transformational leader is likely to increase teachers' admiration (through supportive actions and vision), which in turn makes teachers more resilient to stress and exhaustion. This mediating role of admiration is a novel consideration in special education burnout research, building on organizational studies, which find that positive follower-leader relationships improve employee well-being.

Transformational leadership fosters positive emotional responses such as admiration, respect, and trust among employees (Bass & Riggio, 2006a, 2006b). Leaders who demonstrate charisma, provide a clear vision, and offer personalized support are often admired by subordinates. Admiration refers to a positive reaction toward someone exhibiting competence, trustworthiness, and inspiration (Algoe & Haidt, 2009). This admiration enhances employee engagement, motivation, and commitment, reinforcing belief in the leader's vision (Avolio et al., 2009). Across various sectors, including education, healthcare, and corporate environments, admiration for transformational leaders correlates with higher employee satisfaction and well-being (Ahmad et al., 2024). In special education, transformational leadership plays a crucial role in fostering teacher admiration. Given the high emotional and cognitive demands, leaders who offer individualized support, articulate a clear vision for inclusive education, and recognize teachers' unique contributions inspire admiration, especially as teachers often feel undervalued (Galliani & Vianello, 2012). This admiration boosts teachers' emotional and professional commitment.

Teacher admiration for leadership directly impacts burnout. Burnout, characterized by emotional exhaustion, depersonalization, and reduced personal accomplishment, is mitigated when employees admire and trust their leaders. Admiration provides a sense of belonging and trust, buffering against emotional exhaustion (Michel et al., 2013). When employees feel valued and respected by their leaders, they are more likely to remain engaged and motivated, strengthening resilience against stress (Carmeli et al., 2020).

Admiration for leadership in the special education sector is a powerful protective factor against burnout in the special education sector. Admiration by teachers for their leaders means they are supported and appreciated (Baker et al., 2015), which reduce their risk of burnout. Individualized support and recognition by transformational leaders generate admiration and an atmosphere where teachers are engaged to meet his or her high demands on being a role. Furthermore, teacher admiration may serve as a mediator between transformational leadership and burnout. Transformational leaders create a supportive work environment to foster admiration that lowers the likelihood of burnout (Hildenbrand et al., 2018). Emotional engagement and support that follows admiration buffer burnout characteristics. Admiration then links positive effects of transformational leadership to lower burnout levels. In particular, admiration for leadership serves as a particularly important mediator of admiration for leadership in special education, where demands are particularly high. Teachers who respect their leaders are empowered and supported and are able to cope with role stressors (Brunsting et al., 2014). It explains why transformational leadership lessens the burnout by creating mediators of positive emotional responses that increase well-being and job satisfaction. Per JD-R theory, the use of transformational leadership as a job resource will enable employees to manage the demands and prevent burnout. Teacher admiration is a major job resource that provides emotional and psychological support to deal with high demands. Admiration is a mediator according to JD-R theory, being connected to lower burnout levels and transformational leadership and social and emotional factors in the management of the job demands in special education through the role of admiration. Based on this discussion, the study proposes the following

hypotheses:

H2. Transformational leadership is positively related to teacher admiration among special education teachers.

H3. Teacher admiration is negatively related to burnout among special education teachers.

H4. Teacher admiration mediates the relationship between transformational leadership and burnout among special education teachers.

Cognitive empathy is the ability to understand and intellectually appreciate another's perspective and feelings (often termed perspective-taking) (Smith, 2006). In teaching, and particularly in special education, cognitive empathy allows educators to anticipate student needs, adapt instruction, and handle behavioral challenges with insight and patience. High cognitive empathy helps teachers interpret why a student might be struggling or acting out, leading to more effective and less frustrating responses. This skill is thus a psychological resource that can reduce stress: teachers with strong cognitive empathy experience fewer negative emotional surprises and conflicts, thereby lowering emotional exhaustion over time. Prior research indicates that fostering teachers' perspective-taking abilities can improve classroom climate and decrease feelings of burnout, as teachers feel more efficacious in managing student issues (Trauernicht et al., 2021). This study considers cognitive empathy in our model as a crucial mediator. Transformational leaders likely boost employees' cognitive empathy by modeling empathetic attitudes (Sergey et al., 2020), promoting professional development on inclusive practices, and encouraging reflective dialogue about students. For example, a leader might encourage teachers to share success stories and challenges in team meetings, which can broaden each teacher's understanding of different student perspectives. Studies have shown that leadership that emphasizes intellectual stimulation and individualized consideration, both components of transformational leadership, can increase followers' empathy and prosocial behaviors (Menegazzo et al., 2015). Thus, the study expects transformational leadership to positively relate to cognitive empathy. In turn, higher cognitive empathy should relate to lower burnout because empathetic teachers cope better with student-related stressors and find greater meaning in their work. Cognitive empathy is anticipated to mediate the transformational leadership–burnout link: i.e., transformational leadership reduces burnout partially by helping teachers develop greater cognitive empathy, which functions as a coping resource that offsets work demands.

Transformational leadership not only fosters admiration but also promotes cognitive empathy, the ability to understand others' thoughts and feelings (Davis, 1983). This is vital in professions like education, where interpersonal relationships and emotional intelligence are important. Transformational leaders encourage open communication, critical thinking, and individualized support, cultivating cognitive empathy in followers (Jiang & Lu, 2020). By practicing intellectual stimulation, they challenge employees to consider different perspectives and the needs of others, fostering an environment where cognitive empathy thrives. In special education, cognitive empathy is especially critical. Teachers work with students who have diverse learning needs and behavioral challenges, making cognitive empathy essential (Chang et al., 2021). Transformational leaders who emphasize understanding students' unique perspectives help teachers enhance their cognitive empathy, improving interactions and fostering a more inclusive environment (Obliopas et al., 2020).

Cognitive empathy plays a crucial role in mitigating burnout. While burnout involves emotional exhaustion, cognitive factors influence how individuals cope with stress (Trauernicht et al., 2021). Employees with high cognitive empathy approach stressful situations with a better understanding of others, reducing the emotional toll of work. This perspective-taking prevents emotional exhaustion, a key component of burnout, and improves interpersonal relationships, decreasing workplace conflicts.

Cognitive empathy is an important buffer against burnout for special

education teachers. Without it, working with special needs students can be overwhelming (Nwosu et al., 2021). Teachers with strong cognitive empathy know how best to help their students through their challenges, making it more rewarding work and less stressful, protecting teachers from burnout. Transformational leadership is mediated by cognitive empathy with burnout. Miller (2009) assert that transformational leaders do so by cultivating cognitive empathy through individualized consideration and intellectual stimulation, which, in turn, reduces burnout. It is especially pronounced in special education. Interactions and emotional resilience are significantly reduced by transformational leaders who encourage understanding of students' perspectives. From the perspective of the JD-R theory, cognitive empathy is a critically important job resource for managing work demands. Cognitive empathy created by transformational leadership empowers employees to cope with complex social and emotional job challenges. It protects against burnout by improving the understanding and responding to people's needs, and thereby decreasing emotional exhaustion caused by high demands (Demerouti et al., 2001). In turn, cognitive empathy mediates the relationship between transformational leadership and burnout and provides protection from workplace stressors.

H5. Transformational leadership is positively related to cognitive empathy among special education teachers.

H6. Cognitive empathy is negatively related to burnout among special education teachers.

H7. Cognitive empathy mediates the relationship between transformational leadership and burnout among special education teachers.

Sense of responsibility is defined as a teacher's internalized duty to ensure student success and well-being, often accompanied by feelings of accountability for student outcomes (Boyd et al., 2018). Teachers high in this trait strongly feel "my students' failure is my failure," which can drive them to invest extra effort in planning, mentoring, and continuous improvement. In many ways, a healthy sense of responsibility is desirable, as it aligns with professional standards and can motivate teachers to seek better strategies and support students persistently. However, an excessive or unsupported sense of responsibility may lead teachers to shoulder unrealistic burdens, potentially contributing to stress. Lauer-mann and Karabenick (2013) note that teacher responsibility is distinct from self-efficacy: it is not just confidence in ability, but a moral imperative that can either energize or overwhelm a teacher depending on context. In supportive environments, responsible teachers thrive; in challenging environments without adequate support, they may experience guilt and burnout. The study includes the teacher's sense of responsibility as a moderating variable to explore how this personal factor interacts with leadership and the mediators. It is plausible that when teachers have a high sense of responsibility, transformational leadership's effects could be intensified – for instance, these teachers might respond more strongly to a leader's guidance by working even harder to be empathetic and admirable professionals. This could amplify the positive impact of transformational leadership on reducing burnout (because the teacher eagerly utilizes the support) or, if taken to an extreme, it could introduce some additional pressure ("I must live up to this supportive leader's expectations"). Previous literature suggests mixed outcomes: a strong sense of responsibility can improve teaching performance, but also correlates with higher stress if teachers feel solely accountable for uncontrollable outcomes.

How employees perceive and respond to workplace demands depends a lot on a sense of responsibility. Teachers who are personally responsible for their students' success tend to have a strong sense of responsibility for their students' success, which can motivate them but can also make them susceptible to stress (Lauer-mann & Karabenick, 2013). Such heightened responsibility pushes teachers to do more than their fair share, to keep students engaged and invested. But it can also increase pressure and emotional exhaustion, especially when there is no support (Skaalvik & Skaalvik, 2017). As a result, it can increase

effectiveness, but it also increases vulnerability to burnout. In the context of transformational leadership, sense of responsibility moderates between leadership and mediator variables such as admiration and cognitive empathy. Furthermore, transformational leaders who give support can encourage more admiration from teachers who feel exceptionally accountable (Bass & Riggio, 2006a, 2006b). Leadership that provides the resources these teachers need to meet their responsibilities is met with a positive response from these teachers. On the contrary, even transformational leadership is not able to fully mitigate burnout if high expectations result in emotional exhaustion (Carmeli & Spreitzer, 2009). Consequently, teacher admiration is influenced by sense of responsibility and, in turn, transformed leadership affects burnout levels. The path between transformational leadership and cognitive empathy is expected to be moderated by sense of responsibility. Under transformational leadership, teachers with a strong sense of responsibility tend to develop cognitive empathy as they want to understand their students' needs. However, when this responsibility becomes too much, it can become a cognitive and emotional burden that may prevent leadership from having a positive effect on cognitive empathy. Supportive leadership may still not help when the responsibility is heightened, thus increasing burnout risk (Leithwood & Jantzi, 2006). Thus, the moderating role of sense of responsibility is crucial in determining whether transformational leadership can effectively reduce burnout through cognitive empathy. Within the JD-R framework, sense of responsibility acts as either a motivator or a potential threat to burnout risk. When job resources like transformational leadership are present, a strong sense of responsibility can enhance positive effects, fostering admiration and cognitive empathy that reduce burnout (Schaufeli & Bakker, 2004). However, when job demands outweigh resources, it may exacerbate stress, reducing the effectiveness of transformational leadership. As a moderator, sense of responsibility determines the extent to which transformational leadership can buffer against burnout through its influence on key mediators. Hence:

H8a. Teacher sense of responsibility moderates the relationship between transformational leadership and teacher admiration, such that the relationship is stronger for teachers with higher levels of responsibility.

H8b. Teacher sense of responsibility moderates the relationship between transformational leadership and cognitive empathy, such that the relationship is stronger for teachers with higher levels of responsibility.

3. Methodology

This study adopted a quantitative, cross-sectional survey design to test the proposed model and hypotheses. This approach was appropriate because our goal was to examine statistical relationships between multiple latent constructs (leadership, burnout, etc.) and to evaluate mediation/moderation effects in a large teacher sample (Liu et al., 2024). A survey design allowed standardized data collection on psychological variables, and the cross-sectional snapshot captured the state of these variables during the study period (Guan et al., 2023). This study chose Partial Least Squares Structural Equation Modeling (PLS-SEM) for data analysis due to the complexity of our model, which includes two mediators and a moderator (Murtaza et al., 2021). PLS-SEM (implemented via SmartPLS) is well-suited for predictive models with latent variables and can handle relatively smaller sample sizes while maintaining statistical power (Fu et al., 2023). This method allowed us to simultaneously assess the measurement model (validity and reliability of our constructs) and the structural model (paths between constructs) within one analytical framework. Overall, the quantitative design and PLS-SEM analysis provided a rigorous means to quantitatively evaluate our hypotheses about how leadership and empathy-related factors affect burnout.

3.1. Participants and data collection procedure

The study was conducted in mainland China with special education teachers as the target population. The study focused on three major urban centers, Chengdu, Wuhan, and Nanjing, selected for their diverse educational environments and strong special education programs. Chengdu and Wuhan are known for robust public education and inclusive schooling initiatives, while Nanjing is a national hub for special education teacher training and innovation. By sampling from these cities, the study aimed to capture a broad perspective on special education contexts in China. This study coordinated with local school authorities to reach special education teachers across multiple schools (both special schools and inclusive programs).

Data collection occurred in three waves over two months. In the first wave, the study gathered demographic information and data on transformational leadership in special education and special education teacher admiration. The second wave focused on student-centered cognitive empathy and special education teachers' sense of responsibility. In the final wave, the study collected data on special education work burnout. Surveys were administered primarily in person, and research team members or trained school staff distributed paper questionnaires during staff meetings or professional development sessions. Each questionnaire began with an introduction and the consent form, followed by the scale items. To further reduce common method variance, the study employed several procedural techniques: the study emphasized anonymity to encourage candor, randomized item order within each section to avoid response patterns, and gave clear instructions stressing honest responses over "right" answers. The current study also pilot-tested the survey with a small group of 15 special education teachers to ensure clarity of language (especially after translation of some scale items into Chinese). Pilot feedback was used to refine wording for cultural relevance and comprehension (Fu et al., 2022; Liu et al., 2024).

The study followed strict rules of ethics during the research. Before gathering data, the project was approved by the ethics committee of the institution. After reading a description of the study's purpose and process, all the participants gave their consent. Teachers were allowed to take part in the research only if they agreed and could stop at any time without facing any issues. No information about people's identities was collected during the survey (Xu et al., 2022; Yu et al., 2021). For confidentiality, the study made sure that all completed questionnaires were kept safe and only the gathered data were examined. The survey was given out by each administration, but they did not take part in analyzing the data to protect teachers' privacy. The study made sure teachers could do the survey at their convenience and sent the results to any school that wanted to see them as a sign of respect. They conducted research on human ethics, earned trust from the participants, and probably helped people answer honestly. A stratified sampling approach by city was used, and within each city, teachers were approached via their schools. To ensure a sufficient sample size for the PLS-SEM model, the study conducted a power analysis using G*Power. Setting a moderate effect size ($f^2 \approx 0.15$), $\alpha = 0.05$, and desired power = 0.80, the analysis recommended a minimum of ~400 teachers to detect the smallest effect of interest (given our model structure with several predictors). Anticipating some non-response, the authors distributed 700 questionnaires (approximately proportional to the number of special education teachers in each city). The study achieved a strong response: 462 teachers returned completed surveys. After data screening, the study excluded 23 responses due to substantial missing data or inconsistent answers (e.g., identical ratings for all questions, indicating inattentive responding). The final sample size was 439 special education teachers. This sample exceeds the power analysis requirement and enhances the robustness of our findings. Table 1 presents the demographic characteristics of participants (e.g., age, gender, years of experience). In brief, the teacher sample included a balanced mix of early-career and veteran teachers, with a majority in the 25–44 age range, and

Table 1
Socio-Demographic Characteristics of the Sample.

Variable	Category	Frequency	Percentage (%)
Age	25–34 years	150	34.20 %
	35–44 years	120	27.30 %
	45–54 years	90	20.50 %
	55 years and above	79	18.00 %
Gender	Male	180	41.00 %
	Female	259	59.00 %
Teaching Experience	1–5 years	100	22.80 %
	6–10 years	130	29.60 %
	11–15 years	110	25.10 %
	16 years and above	99	22.50 %
Highest Qualification	Bachelor's Degree	250	56.90 %
	Master's Degree	150	34.20 %
	Doctorate	39	8.90 %
Type of School	Public	300	68.30 %
	Private	139	31.70 %
Province/Region	Chengdu	160	36.40 %
	Wuhan	140	31.90 %
	Nanjing	139	31.70 %

represented a range of school types (inclusive programs and dedicated special schools). (See Fig. 1.)

3.2. Measures

To measure the constructs in this study, fused well-established and published scales to ensure rigor and validity. Utilizing recognized scales allows us to build on previous research, ensuring reliability and acceptance within the academic community. All items were measured using a five-point Likert scale ranging from “strongly disagree” to “strongly agree.” Expert evaluations were also conducted by field practitioners and academicians, who provided feedback on the relevance and adequacy of the items. This process helped refine the instrument and confirm its suitability for the study. **Transformational leadership in special education** was measured using seven items adapted from Carless et al. (2000) Global Transformational Leadership Scale. A sample item is, “Our educational supervisor communicates a clear and inspiring vision for the future of special education.” This scale assesses leadership effectiveness and communication in educational settings. Teacher

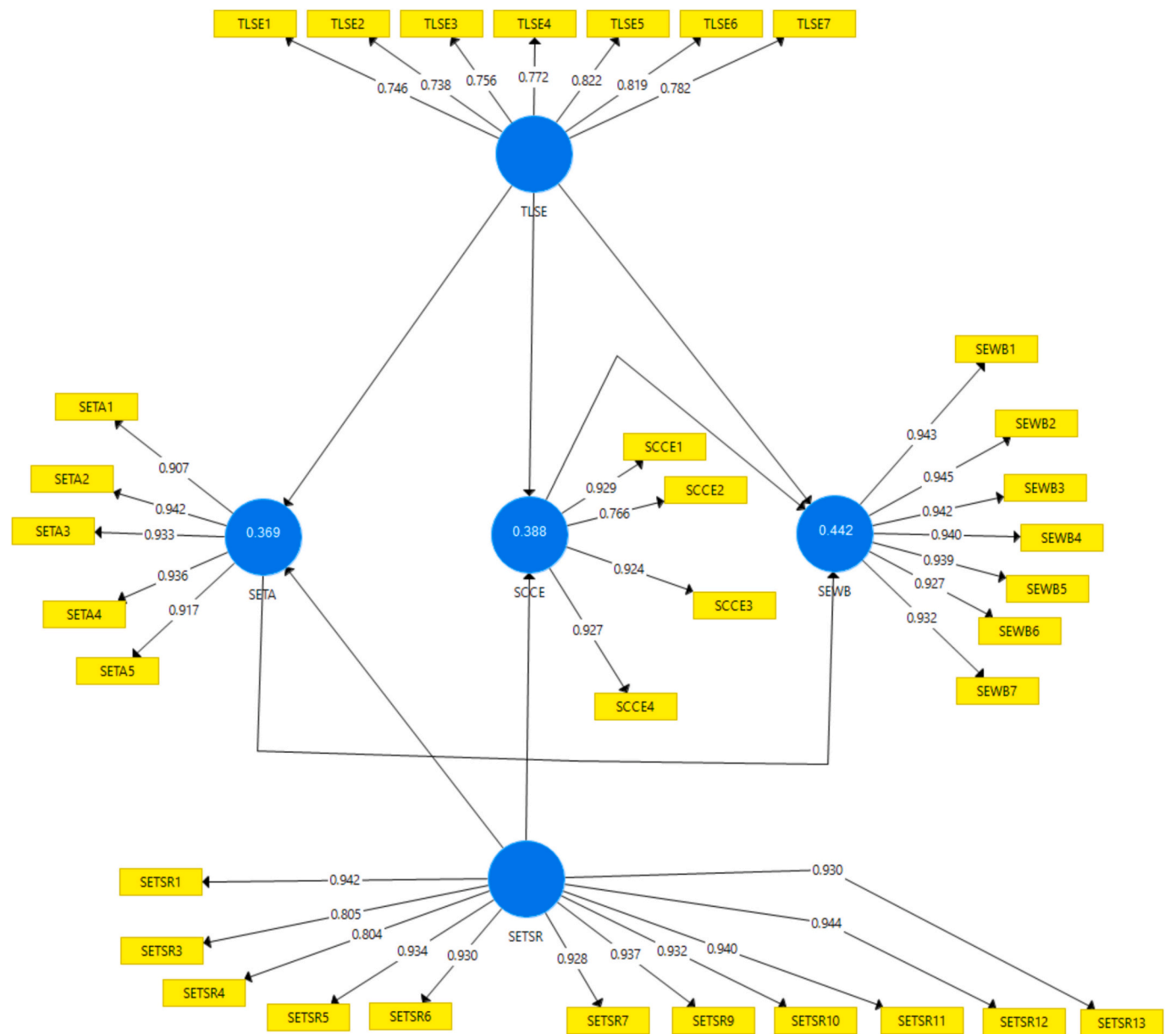


Fig. 1. The Measurement Model.

burnout was assessed with seven items from the work-related burnout scale developed by Kristensen et al. (2005). A representative item is, “I feel worn out at the end of the school day.” This scale is respected for measuring emotional exhaustion and teacher fatigue.

Student-centered cognitive empathy was measured using four items adapted from cognitive empathy scales by Bettencourt et al. (2001). A sample item is, “I try to look at every side of a student’s situation before making decisions about their learning plan.” This scale captures the teacher’s ability to understand and empathize with students’ perspectives. **Special education teacher sense of responsibility** was measured using 13 items from Lauermann and Karabenick (2013). A sample item is, “I would feel personally responsible if a student in my special education class failed to make excellent progress throughout the school year.” This scale assesses teachers’ sense of personal accountability for student outcomes. **Special education teacher admiration** was assessed with five items adapted from a scale by Sweetman et al. (2013). A sample item is, “I feel admiration when I think about my special education institution.” This scale measures the respect and admiration teachers have for their institution. Each scale was translated into Chinese by bilingual experts using translation-backtranslation to ensure accuracy. Pilot testing confirmed that the items were clear to Chinese teachers and culturally appropriate. The study also performed expert review: two special education scholars and two school principals examined the survey and endorsed the relevance of each item to the construct (minor wording adjustments were made based on their input).

To mitigate common method bias, the study employed procedural and statistical techniques. Participants were assured anonymity to reduce biased responses due to social desirability. The questionnaire was administered in multiple waves, reducing potential recall bias. Questions were randomized to prevent response patterns from question order effects. Statistically, the study conducted Harman’s single-factor test to assess common method variance. Results indicated that no single factor accounted for the majority of variance, suggesting common method bias was not significant. To reduce social desirability bias, the authors emphasized the importance of honest and accurate responses in the instructions. Questions were neutrally framed to avoid leading participants to socially acceptable answers. Reverse-scored items were included to detect inconsistent responding and reduce automatic, socially desirable answering patterns.

3.3. Data analysis

The study used SmartPLS to perform PLS-SEM analysis. The analysis proceeded in two stages. First, the study assessed the measurement model for reliability and validity. All construct measures demonstrated high internal consistency, with Cronbach’s α and composite reliability values above 0.85 for each construct. Indicator reliability was evidenced by factor loadings mostly above 0.70 on their intended constructs (all retained items met this criterion). The study also confirmed convergent validity as the average variance extracted (AVE) for each construct exceeded 0.50. Discriminant validity was checked via the Fornell-Larcker criterion and HTMT ratios, which were all within acceptable limits (no HTMT >0.85), indicating that each construct was distinct from the others.

Next, the study examined the structural model to test our hypotheses. The authors bootstrapped the PLS model with 5000 resamples to obtain robust estimates of path coefficients, standard errors, and confidence intervals. The model fit and predictive power were evaluated using R^2 values. The R^2 for burnout was substantial (around 0.40), meaning about 40 % of the variance in burnout was explained by the model predictors (leadership, admiration, empathy, and interactions). The R^2 for cognitive empathy was about 0.39, indicating transformational, and the moderator explained roughly 39 % of the variance in SCCE. The study also checked for any multicollinearity issues among predictors; all variance inflation factors (VIFs) were below 3, suggesting no multicollinearity problem. Results for each hypothesized path (direct,

mediated, and moderated) were then interpreted, as described in the next section. All significance tests used a $p < 0.05$ threshold.

4. Results

The analysis for this study was conducted using SMART-PLS, a partial least squares structural equation modeling (PLS-SEM) tool that is particularly useful for handling complex models with multiple constructs, mediators, and moderators. SMART-PLS was chosen due to its ability to work with smaller sample sizes and its robustness in modeling relationships between latent variables. The analysis focused on evaluating the measurement model (reliability and validity of constructs) and the structural model (relationships between the variables). The following abbreviations are used for the variables in this section: Transformational leadership in special education (TLSE), special education work burnout (SEWB), student-centered cognitive empathy (SCCE), special education teacher admiration (SETA), and special education teacher sense of responsibility (SETSR).

To assess the measurement model, the study examined the loadings, composite reliability, and average variance extracted (AVE) for each variable. All item loadings exceeded the acceptable threshold of 0.70, confirming indicator reliability. The composite reliability values for all constructs exceeded 0.9, indicating strong internal consistency reliability, and the AVE values were all above 0.5, ensuring convergent validity. The combined results of loadings, composite reliability, AVE, and R-squared values are presented below in Table 2. The R-squared values show that SCCE had an R^2 of 0.388, indicating that transformational leadership explains 38.8 % of the variance in cognitive empathy. SETA had an R^2 of 0.369, and SEWB had an R^2 of 0.442, indicating that the proposed model explains 44.2 % of the variance in burnout.

To assess the discriminant validity of the constructs, the study

Table 2
Measurement model assessment.

Variable	Item	Loading	Composite Reliability	AVE	R Square
SCCE	SCCE1	0.929	0.938	0.791	0.388
	SCCE2	0.766			
	SCCE3	0.924			
	SCCE4	0.927			
SETA	SETA1	0.907	0.936	0.86	0.369
	SETA2	0.942			
	SETA3	0.933			
	SETA4	0.936			
	SETA5	0.917			
SETSR	SETSR1	0.942	0.942	0.833	
	SETSR10	0.932			
	SETSR11	0.94			
	SETSR12	0.944			
	SETSR13	0.93			
	SETSR3	0.805			
	SETSR4	0.804			
	SETSR5	0.934			
	SETSR6	0.93			
SEWB	SETSR7	0.928	0.918	0.88	0.442
	SETSR9	0.937			
	SEWB1	0.943			
	SEWB2	0.945			
	SEWB3	0.942			
	SEWB4	0.94			
	SEWB5	0.939			
TLSE	SEWB6	0.927	0.914	0.604	
	SEWB7	0.932			
	TLSE1	0.746			
	TLSE2	0.738			
	TLSE3	0.756			
	TLSE4	0.772			
	TLSE5	0.822			
	TLSE6	0.819			
	TLSE7	0.782			

examined the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio (Table 3). Discriminant validity ensures that the constructs are distinct and measure different aspects of the model. A key part of assessing discriminant validity involves confirming that the square root of AVE for each construct is greater than its correlation with any other construct. Additionally, the HTMT ratios provide another robust test of discriminant validity, with values below 0.85 indicating good discriminant validity. The square root of each construct's AVE is presented along the diagonal of the table, and the correlations between constructs are shown off-diagonal. The results indicate that all constructs meet the Fornell-Larcker criterion, as the square root of the AVE for each construct is greater than its correlation with other constructs. This confirms the discriminant validity of the constructs in the model. The results show that the square root of the AVEs (bold diagonal values) for all variables is higher than the off-diagonal correlations, meeting the Fornell-Larcker criterion for discriminant validity. Moreover, the HTMT ratios (values in parentheses) are all below 0.85, indicating strong discriminant validity between the constructs.

The analysis using SMART-PLS revealed significant relationships among the variables (Table 4). The direct relationship between TLSE and SEWB was significant ($\beta = -0.295$), indicating that transformational leadership directly reduces burnout. This underscores the importance of effective leadership in mitigating work-related burnout. The path from TLSE to SETA was highly significant ($\beta = 0.449$), showing that transformational leadership boosts teacher admiration. Teachers who admire their leaders are likely to experience positive emotional connections, reinforcing the value of leadership that fosters admiration and respect. The effect of SETA on SEWB was also significant ($\beta = -0.377$), confirming that teacher admiration is negatively related to burnout. Teacher admiration serves as an emotional buffer against job stress, and the mediating role of SETA between TLSE and SEWB was supported ($\beta = -0.169$), demonstrating that transformational leadership reduces burnout by enhancing teacher admiration.

Similarly, TLSE significantly affected SCCE ($\beta = 0.441$), confirming that transformational leadership enhances teachers' cognitive empathy, crucial in special education settings. The path from SCCE to SEWB was significant ($\beta = -0.233$), indicating that teachers with higher cognitive empathy experience lower burnout levels. Teachers better able to understand their students' perspectives find their work more fulfilling and less stressful, reducing burnout risk. The mediating role of SCCE between TLSE and SEWB was supported ($\beta = -0.103$), showing that transformational leadership reduces burnout by increasing cognitive empathy.

The moderating role of SETSR showed mixed results. SETSR did not significantly moderate the relationship between TLSE, admiration, and burnout (non-significant $\beta = 0.023$). However, it significantly moderated the relationship between TLSE, cognitive empathy, and burnout ($\beta = -0.019$). This suggests that teachers with a strong sense of responsibility may feel more pressured to engage empathetically with their students, amplifying the effect of transformational leadership on cognitive empathy and, ultimately, on burnout. Fig. 2 includes the full structural model of our study.

Table 3
Correlations, square root of AVEs, and HTMT ratios.

Variable	SCCE	SETA	SETSR	SEWB	TLSE
SCCE	0.889	0.483	0.359	-0.377	0.295
SETA	(0.742)	0.927	0.415	-0.278	0.369
SETSR	(0.700)	(0.634)	0.913	-0.366	0.332
SEWB	(0.816)	(0.705)	(0.578)	0.938	-0.409
TLSE	(0.644)	(0.605)	(0.488)	(0.600)	0.777

Note: Diagonal values (in bold) represent the square root of AVEs. Off-diagonal values represent correlations between constructs. Below the diagonal values in parentheses represent HTMT ratios.

5. Discussion

This study provides empirical evidence on how transformational leadership and related social-cognitive factors impact special education teacher burnout in China. Consistent with our expectations and prior theory (Chen et al., 2022; Tsang et al., 2022), transformational leadership was associated with significantly lower burnout among special education teachers. Teachers who perceived their school leaders as more transformational, offering vision, support, and intellectual stimulation, reported less emotional exhaustion and cynicism in their jobs. This finding aligns with the JD-R framework: Transformational leadership functions as a crucial job resource that offsets the high demands of special education teaching. Importantly, our results show that this protective effect of leadership is partially mediated by two factors: teacher admiration and cognitive empathy. In our sample, transformational leadership led to higher levels of both admiration and cognitive empathy in teachers, and in turn, those teachers experienced lower burnout. This confirms the past research that both the emotional pathway and the cognitive pathway are mechanisms through which good leadership can reduce burnout (Baker et al., 2015; Hildenbrand et al., 2018; Jiang & Lu, 2020). Notably, teacher admiration had a relatively strong relationship with reduced burnout (teachers with greater admiration for their institution had significantly lower burnout levels, $\beta \approx -0.38$). This suggests that when teachers *value and trust their leadership*, they gain emotional resilience possibly feeling more supported and committed, which buffers stress. The cognitive empathy pathway also proved significant: teachers with higher student-centered empathy had lower burnout ($\beta \approx -0.23$), and transformational leadership boosted this empathy ($\beta \approx 0.44$), resulting in an indirect effect on burnout. Although the empathy-mediated effect was slightly smaller than the admiration-mediated effect, its significance underlines that understanding students is indeed a protective factor against burnout, and one that leadership can foster.

Our moderation analysis yielded comprehensive insights about the role of teachers' sense of responsibility. The study found that sense of responsibility moderated the leadership $\rightarrow$ empathy $\rightarrow$ burnout pathway, but not the leadership $\rightarrow$ admiration pathway. In other words, highly responsible teachers differed from their peers mainly in how they responded to transformational leadership's influence on cognitive empathy (and subsequent burnout). Specifically, the data indicate that for teachers with a strong sense of responsibility, the positive effect of transformational leadership on increasing their empathy was even stronger, which in turn led to an even greater reduction in burnout (i.e., the indirect effect via empathy was amplified). This result suggests that teachers who feel very accountable for student outcomes embrace leadership encouragement to build empathy perhaps more vigorously; they may be especially motivated to follow a leader's guidance to better understand and help their students, thereby reaping larger benefits in terms of reduced stress. On the other hand, our finding that sense of responsibility did *not* significantly moderate the admiration pathway (leadership's effect on admiration or the admiration-burnout link) is interesting. It implies that admiration for leaders benefited all teachers somewhat uniformly, regardless of their personal sense of responsibility. Even teachers with lower responsibility felt less burned out when they admired their leaders, and highly responsible teachers did too, responsibility didn't change that dynamic. The divergent moderation result might reflect that cognitive empathy development involves more active personal effort and engagement (which highly responsible teachers might invest more in under a great leader), whereas feeling admiration is a more uniformly shared emotional response to leadership quality.

Additionally, the study examines the moderating role of the special education teacher's sense of responsibility. Our findings indicate that responsibility interacts with leadership and cognitive empathy to moderate the relationship with burnout. The possibility of experiencing the positive effects of transformational leadership on cognitive empathy and

Table 4
Hypotheses analysis summary.

Path	Beta Coefficient	Standard Deviation (SD)	t-Statistic	p-Value	Bias-Corrected Lower CI	Bias-Corrected Upper CI	Result
TLSE → SEWB (H1)	−0.295	0.053	5.540	0.000	−0.392	−0.183	Supported
TLSE → SETA (H2)	0.449	0.042	10.597	0.000	0.362	0.524	Supported
SETA → SEWB (H3)	−0.377	0.068	5.512	0.000	−0.504	−0.249	Supported
TLSE → SETA → SEWB (H4)	−0.169	0.038	4.486	0.000	−0.246	−0.105	Supported
TLSE → SCCE (H5)	0.441	0.041	10.856	0.000	0.350	0.512	Supported
SCCE → SEWB (H6)	0.233	0.060	3.896	0.000	0.116	0.347	Supported
TLSE → SCCE → SEWB (H7)	−0.103	0.030	3.473	0.001	−0.160	−0.049	Supported
Moderating Effect 2 (SETSR) → SETA → SEWB (H8a)	0.023	0.015	1.534	0.126	−0.053	0.002	Not Supported
Moderating Effect 1 (SETSR) → SCCE → SEWB (H8b)	−0.019	0.009	2.111	0.042	−0.042	−0.004	Supported

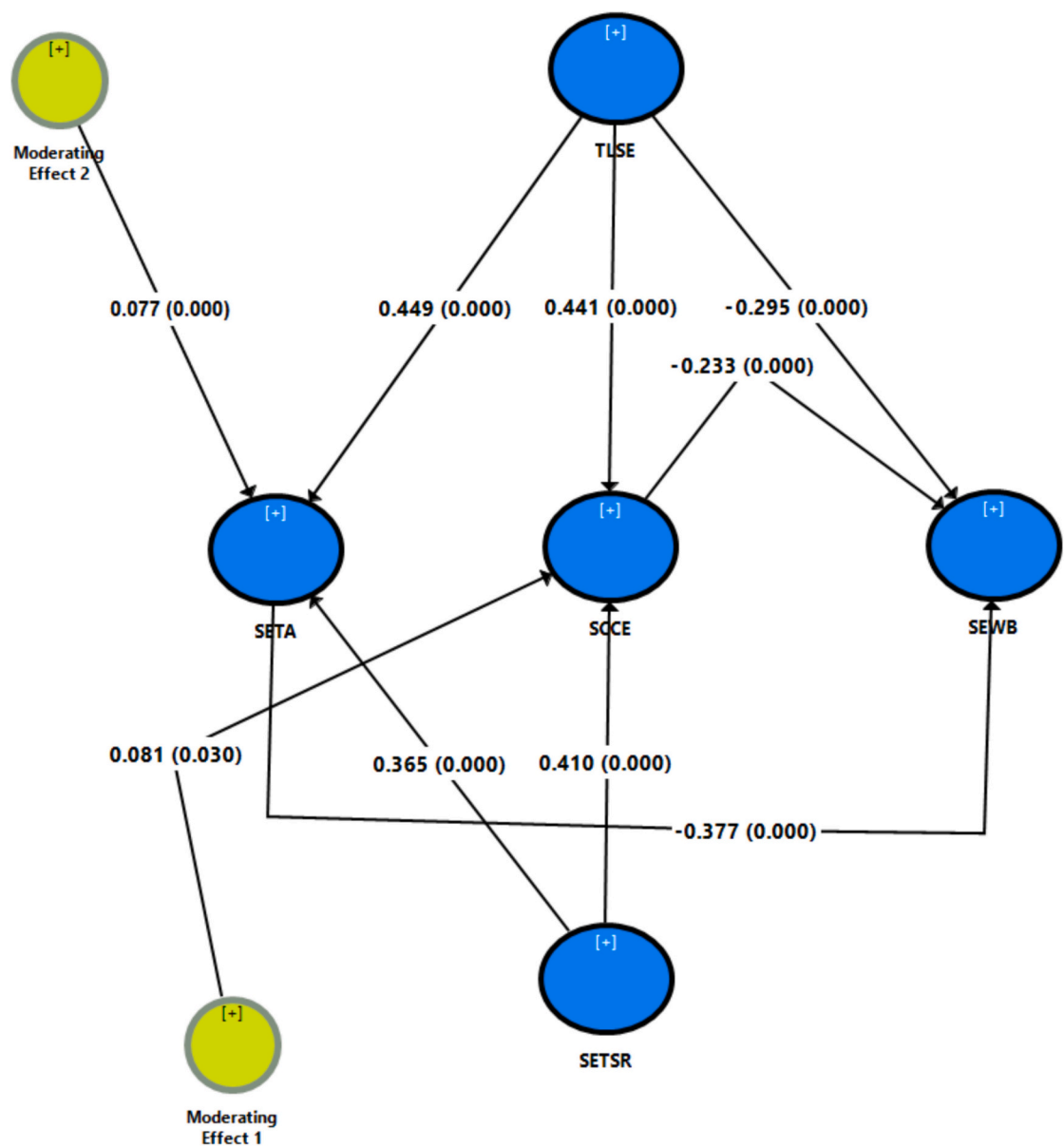


Fig. 2. The full structural model.

reducing burnout is greater among teachers who are responsible. This suggests that the responsibility level of teachers is complexly interwoven into the equation of personal responsibility and leadership, and hence, interventions should take into account the variation of the responsibility

level of teachers. Our study also aligns with SDGs 3 and 4. By mitigating burnout and enhancing teacher well-being, the study supports SDG 3, emphasizing mental health as essential to productivity. Reducing burnout promotes healthier, more resilient educators. By enhancing

leadership practices that foster empathy and admiration, the study contributes to SDG 4, advocating for inclusive and equitable quality education. Emotionally and cognitively supporting special education teachers improves education for students with special needs in sustainable and inclusive environments.

These findings paint a comprehensive picture: transformational leadership reduces burnout directly and via fostering positive attitudes (admiration) and skills (empathy). Teachers' personal dispositions, like responsibility, can shape how strongly some of these processes occur. Overall, the results underscore the multifaceted nature of burnout, encompassing emotional, cognitive, and personal dimensions, and confirm that supportive leadership can address all these dimensions to some extent.

5.1. Theoretical implications

Our study contributes to educational psychology and leadership literature by integrating social-emotional factors and individual traits into the understanding of teacher burnout. First, the study extends the JD-R theory in a new context, showing that a school leadership behavior (transformational leadership) is an effective resource that combats burnout in special education settings. This adds evidence from China to mostly Western-centric literature on JD-R, supporting the theory's cross-cultural applicability. Second, the study introduces teacher admiration as a mediator in the burnout process. While admiration of leadership is known to boost employee morale, its specific link to reducing burnout has been underexplored. Our findings suggest that admiration is not just a byproduct of good leadership; it is a meaningful emotional mechanism that can improve teachers' resilience. This insight enriches burnout models by highlighting an affective-social component (admiration for leaders/institution) as a buffer against stress. Third, the study reinforces the role of cognitive empathy in teacher well-being. Prior studies of teacher burnout have largely focused on emotional exhaustion and support, but our results emphasize that the cognitive aspect of empathy (perspective-taking) is crucial: it directly lowers burnout and carries the influence of leadership. This suggests that theories of burnout should incorporate teachers' cognitive-emotional skills, not just their emotional states. Fourth, regarding sense of responsibility, our moderation result adds nuance to how personal traits interact with organizational factors. It aligns with person-environment interaction theories, illustrating that the efficacy of leadership interventions can depend on teacher characteristics. Highly responsible teachers responded particularly well to leadership in terms of developing empathy, a finding that may encourage theorists to consider such trait-moderated effects (for example, the concept of "motivational fit": transformational leadership might be especially impactful for teachers who are already strongly internally motivated). However, our results also caution that if the sense of responsibility were to manifest as excessive self-pressure, it could have complex effects (though the study did not directly measure negative outcomes of responsibility, the "pressure" interpretation the study offered invites further theoretical inquiry). In sum, our study weaves together leadership theory, burnout theory, and individual difference perspectives to present a more holistic theoretical framework: one that accounts for leadership-driven resources, mediating psychosocial processes, and the conditional influence of personal factors in explaining teacher burnout.

5.2. Practical implications

Practically, our findings carry important implications for school administration and education policy, especially in the special education context. Firstly, the strong inverse link between transformational leadership and teacher burnout means that developing transformational leadership skills in principals and department heads should be a strategic priority. Education authorities and teacher-training institutions (in China and elsewhere) can design professional development programs

focusing on transformational leadership behaviors, for example, training school leaders to communicate an inspiring vision for inclusive education, provide individualized support to teachers, recognize teacher accomplishments, and encourage innovative problem-solving. These behaviors, as our study demonstrates, are not just management ideals but have tangible impacts on teacher well-being. By investing in leadership development, schools can indirectly improve teacher retention and performance, since lower burnout is linked to less turnover and better job engagement. Notably, our research suggests that leaders who earn teachers' admiration create a positive school climate. Therefore, school leaders should strive to build trust and demonstrate qualities that merit respect: consistency, fairness, competence, and empathy in their interactions with staff. Simple practices like acknowledging teachers' efforts, involving teachers in decision-making, and embodying the school's values can increase teachers' admiration for leadership and commitment to the school. Education supervisors in China might integrate these points in principal evaluations and feedback, emphasizing people-focused leadership as a criterion.

Secondly, the role of cognitive empathy points to the value of training and resources for teachers that enhance their ability to understand student perspectives. School leaders and districts should provide ongoing professional development on topics such as inclusive teaching strategies, empathy training, and emotional intelligence for teachers. Workshops that include case studies of student behaviors, role-playing exercises, or perspective-taking activities could help teachers broaden their cognitive empathy. Additionally, encouraging teacher collaboration and reflection (e.g., regular meetings where teachers discuss student progress and challenges together) can organically build a more empathetic and supportive teacher community. Our findings indicate that when teachers feel more equipped to handle student needs through understanding, their stress is reduced. Hence, allocating time and resources for such capacity-building is a prudent investment to combat burnout. In practice, some schools have introduced mentorship programs where experienced special educators share techniques for connecting with students, or have utilized coaching by school psychologists – these align with our results by targeting empathy and coping skills. Furthermore, class size reduction and teaching assistant support can also enhance teachers' ability to attend to each student (thus improving cognitive empathy in practice), so policymakers should consider these structural supports in special education.

Thirdly, our moderated findings around sense of responsibility suggest a tailored approach to teacher support. School leaders should be attentive to teachers who display very high levels of personal responsibility. These teachers are often excellent and dedicated, but they might also be at risk of overworking or self-blame. Targeted support and counseling for such teachers is advisable. For instance, principals could ensure that highly committed teachers take adequate breaks, perhaps by rotating demanding assignments, and promote a culture where asking for help is encouraged rather than seen as weakness. Our study implies that when these teachers receive strong leadership (as in our data), they thrive, so continued mentorship and positive feedback to reinforce their efficacy can keep their responsibility from turning into unhealthy perfectionism. However, if a school lacks transformational leadership, highly responsible teachers might suffer; thus, in schools undergoing improvement, administrators might pay special attention to the well-being of veteran teachers who often carry a strong sense of duty.

Importantly, these practical recommendations advance broader societal goals. By reducing burnout and fostering supportive leadership, the study addresses SDG 4: Quality Education, since teacher well-being is directly tied to teaching quality and student outcomes. Burned-out teachers are more likely to be absent or leave the profession, which disrupts student learning, especially for vulnerable students with special needs. Our study underscores that improving the work conditions and leadership in special education can lead to more stable, engaged teachers, thereby improving the continuity and quality of special education services. Moreover, focusing on teacher mental health and job

satisfaction aligns with SDG 3: Good Health and Well-Being, not just for students or the general population, but specifically for educators as a workforce. Teachers' occupational health is often overlooked in policy, but it is a vital component of a healthy education system. Educational authorities in China have recognized the need for "teacher support and construction" in achieving high-quality special education, and our findings provide actionable insights for that mandate: invest in human-centered leadership and teacher development. In a practical sense, ministries of education could incorporate teacher well-being metrics into school evaluations or principal training modules. Also, leveraging modern solutions, for example, providing digital tools and AI-driven platforms to reduce teachers' clerical workload, can complement leadership efforts. Recent commentary suggests that technology (like AI for grading or managing IEP paperwork) can alleviate some burdens on teachers. School leaders who champion such innovations effectively practice a form of digital-age transformational leadership, addressing teachers' pain points through creative resource provision. This not only mitigates burnout but also modernizes special education, making it more efficient and inclusive.

5.3. Limitations and future research directions

While this study is a powerful one, it is not without limitation. The research is confined to the special education teachers in certain region of China, which hinders generalizing of the findings to other educational system or culture contexts. Future research can extend this study to other countries and educational settings to determine if similar patterns are found. Secondly, this study employed a cross-sectional design, which essentially captures relationships at a single point in time, and therefore does not provide us with any information about causality. It would be beneficial to explore over time how transformational leadership, teacher admiration, and cognitive empathy change over time and their long-term effects on burnout in longitudinal studies. Furthermore, the data was based on self-report, which introduces common method bias. Finally, future research may incorporate multi-source data, e.g., peer or supervisor assessments, to improve validity. Finally, considering that the study identified important mediating and moderating variables, future research should investigate other possible psychological or organizational factors influencing the leadership-burnout relationship, for example, job autonomy or school culture, to better understand burnout within the special education context.

6. Conclusion

Finally, this study provides contributions to the relationship between transformational leadership in special education and special education work burnout, with special education teacher admiration and student-centered cognitive empathy serving as critical mediating roles. The study finds that transformational leadership significantly reduces burnout among special education teachers by promoting both emotional and cognitive resources that protect them from the stress associated with their demanding roles. This study highlights the importance of adopting transformational leadership behaviors, including individualized support and intellectual stimulation, to improve teacher well-being in high-pressure environments. The study also provides novel insights into how a special education teacher's sense of responsibility serves as a moderator. Leadership's positive influence on cognitive empathy, which in turn reduces burnout, is more likely to benefit teachers with a heightened sense of responsibility. This implies that leadership strategies need to take account of the differences in teacher responsibility, and provide adequate support and resources to teachers that are particularly responsible for their students to cope with stress. This study also offers practical suggestions for educational administrators and policymakers by focusing on burnout within the special education context. Schools that invest in their own leadership development and cultivate a culture where empathy and emotional connection are important can improve

teacher well-being and resilience, which, in turn, will improve the quality of education for students with special needs. This research also fits with the broader targets of the SDGs, more specifically SDG 3 and SDG 4. This study also contributes to a sustainable educational system by addressing burnout and promoting teacher well-being so that special education teachers are empowered to do so and they can provide inclusive, high-quality education to all students. These findings should be used as a starting point for future research to investigate further the psychological and organizational factors influencing burnout in educational settings.

CRedit authorship contribution statement

Lan Liu: Supervision, Writing – original draft, Conceptualization. **Ke Li:** Writing – review & editing, Funding acquisition, Investigation. **Lulu Yue:** Validation, Project administration, Supervision, Investigation. **Muhammad Zulqarnain Arshad:** Writing – review & editing, Validation, Methodology, Visualization, Software.

Ethical approval

This study was conducted following ethical guidelines and received approval from the Ethics Committee of Suqian University, China. All research procedures involving human participants were performed in compliance with relevant ethical standards, and informed consent was obtained from all participants. Ethical approval for this study was granted by Suqian University under the approval code **SQU-ETH-2023-0245**.

Declaration of competing interest

The authors declare no conflicts of interest.

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Data availability

Data will be made available on request.

References

- Ahmad, N., Han, H., & Kim, M. (2024). Elevated emotions, elevated ideas: The CSR-employee creativity nexus in hospitality. *Journal of Service Theory and Practice*, 34(6), 891–914.
- Algoe, S. B., & Haidt, J. (2009). Witnessing excellence in action: The 'other-praising' emotions of elevation, gratitude, and admiration. *The Journal of Positive Psychology*, 4(2), 105–127.
- Avolio, B. J., Walumbwa, F. O., & Weber, T. J. (2009). Leadership: Current theories, research, and future directions. *Annual Review of Psychology*, 60, 421–449.
- Baker, S. D., Anthony, E. L., & Stites-Doe, S. A. (2015). Most admired leader/most admired follower. *Organization Management Journal*, 12(1), 23–33.
- Bass, B. M., & Riggio, R. E. (2006a). *Transformational leadership*. Psychology press.
- Bass, B. M., & Riggio, R. E. (2006b). *Transformational leadership*. In Lawrence Erlbaum associates publishers (2nd ed.). <https://doi.org/10.4324/9781410617095> doi: 10.4324/9781410617095.
- Benigno, V., Usai, F., Mutta, E. D., Ferlino, L., & Passarelli, M. (2025). Burnout among special education teachers: Exploring the interplay between individual and contextual factors. *European Journal of Special Needs Education*, 40(2), 213–231.
- Bettencourt, L. A., Gwinner, K. P., & Meuter, M. L. (2001). A comparison of attitude, personality, and knowledge predictors of service-oriented organizational citizenship behaviors. *Journal of Applied Psychology*, 86(1), 29.
- Bettini, E., Grobart, E. E., Day, J., & Billingsley, B. (2023). Conceptual frameworks for understanding special educators' decisions to stay or leave. In B. Billingsley (Ed.), *Handbook of research on special education teacher preparation* (pp. 253–274). Routledge.
- Boyd, N., Nowell, B., Yang, Z., & Hano, M. C. (2018). Sense of community, sense of community responsibility, and public service motivation as predictors of employee well-being and engagement in public service organizations. *The American Review of Public Administration*, 48(5), 428–443.

- Brunsting, N. C., Sreckovic, M. A., & Lane, K. L. (2014). Special education teacher burnout: A synthesis of research from 1979 to 2013. *Education and Treatment of Children*, 681–711.
- Bryant, P., Butcher, J. T., & O'Connor, J. (2018). Improving school leadership: The connection of transformational leadership and psychological well-being of the followers. *School Leadership Review*, 11(2), 6.
- Carless, S. A., Wearing, A. J., & Mann, L. (2000). A short measure of transformational leadership. *Journal of Business and Psychology*, 14(3), 389–405.
- Carmeli, A., Dothan, A., & Boojihawon, D. K. (2020). Resilience of sustainability-oriented and financially-driven organizations. *Business Strategy and the Environment*, 29(1), 154–169.
- Carmeli, A., & Spreitzer, G. M. (2009). Trust, connectivity, and thriving: Implications for innovative behaviors at work. *The Journal of Creative Behavior*, 43(3), 169–191.
- Chang, S.-A. A., Tillem, S., Benson-Williams, C., & Baskin-Sommers, A. (2021). Cognitive empathy in subtypes of antisocial individuals. *Frontiers in Psychiatry*, 12, Article 677975.
- Chen, J., Ghardallou, W., Comite, U., Ahmad, N., Ryu, H. B., Ariza-Montes, A., & Han, H. (2022). Managing hospital employees' burnout through transformational leadership: The role of resilience, role clarity, and intrinsic motivation. *International Journal of Environmental Research and Public Health*, 19(17), Article 10941.
- Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, 44(1), 113.
- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology*, 86(3), 499.
- Deng, M., & Zhu, X. (2016). Special education reform towards inclusive education: Blurring or expanding boundaries of special and regular education in China. *Journal of Research in Special Educational Needs*, 16, 994–998.
- Finney, E. A. (2019). *Examining teacher efficacy and sense of responsibility in relation to burnout in alternatively certified teachers Oklahoma State University*.
- Flanagan, E. (2022). Getting special class inclusion on the agenda: Transformational leadership and developing a whole school approach to inclusion. *Reach*, 35(2).
- Fu, B., Ahmad, N., Lho, L. H., & Han, H. (2023). Triple-E effect: Corporate ethical responsibility, ethical values, and employee emotions in the healthcare sector. *Social Behavior and Personality: An International Journal*, 51(12), 1–14.
- Fu, Q., Cherian, J., Ahmad, N., Scholz, M., Samad, S., & Comite, U. (2022). An inclusive leadership framework to foster employee creativity in the healthcare sector: The role of psychological safety and polychronicity. *International Journal of Environmental Research and Public Health*, 19(8), Article 4519.
- Fu, W., Tang, W., Xue, E., Li, J., & Shan, C. (2021). The mediation effect of self-esteem on job-burnout and self-efficacy of special education teachers in Western China. *International Journal of Developmental Disabilities*, 67(4), 273–282.
- Galliani, E. M., & Vianello, M. (2012). The emotion of admiration improves employees' goal orientations and contextual performance. *International Journal of Applied Psychology*, 2(4), 43–52.
- Gong, T., Zimmerli, L., & Hoffer, H. E. (2013). The effects of transformational leadership and the sense of calling on job burnout among special education teachers. *Journal of School Leadership*, 23(6), 969–993.
- Guan, X., Ahmad, N., Sial, M. S., Cherian, J., & Han, H. (2023). CSR and organizational performance: The role of pro-environmental behavior and personal values. *Corporate Social Responsibility and Environmental Management*, 30(2), 677–694.
- Helfrich, H., & Dietl, E. (2019). Is employee narcissism always toxic? the role of narcissistic admiration, rivalry and leaders' implicit followership theories for employee voice. *European Journal of Work and Organizational Psychology*, 28(2), 259–271.
- Hildenbrand, K., Sacramento, C. A., & Binnewies, C. (2018). Transformational leadership and burnout: The role of thriving and followers' openness to experience. *Journal of Occupational Health Psychology*, 23(1), 31.
- Hofstede, G. (2011). Dimensionalizing cultures: The Hofstede model in context. *Online Readings in Psychology and Culture*, 2(1), 8.
- Itri, J. N., & Lawson, L. M. (2016). Ineffective leadership. *Journal of the American College of Radiology*, 13(7), 849–855.
- Jiang, M., & Lu, S. (2020). To empathize, or not empathize in educational leadership. *Journal of Organizational and Educational Leadership*, 5(1), 3.
- Katou, A. A., Koupkas, M., & Triantafyllidou, E. (2022). Job demands-resources model, transformational leadership and organizational performance: A multilevel study. *International Journal of Productivity and Performance Management*, 71(7), 2704–2722.
- Khan, H., Rehmat, M., Butt, T. H., Farooqi, S., & Asim, J. (2020). Impact of transformational leadership on work performance, burnout and social loafing: A mediation model. *Future Business Journal*, 6(1), Article 40.
- Kristensen, T. S., Borritz, M., Villadsen, E., & Christensen, K. B. J. W., & s. (2005). The Copenhagen burnout inventory: A new tool for the assessment of burnout. *Work & Stress*, 19(3), 192–207.
- Lauermann, F., & Karabenick, S. A. (2013). The meaning and measure of teachers' sense of responsibility for educational outcomes. *Teaching and Teacher Education*, 30, 13–26.
- Lei, M., Alam, G. M., & Bashir, K. (2025). The job performance and job burnout relationship: A panel data comparison of four groups of academics' job performance. *Frontiers in Public Health*, 12, Article 1460724.
- Lei, M., Alam, G. M., Bashir, K., & Pingping, G. (2024). Whether academics' job performance makes a difference to burnout and the effect of psychological counselling—Comparison of four types of performers. *PLoS One*, 19(6), Article e0305493.
- Leithwood, K., & Jantzi, D. (2006). Transformational school leadership for large-scale reform: Effects on students, teachers, and their classroom practices. *School Effectiveness and School Improvement*, 17(2), 201–227.
- Ling, G., Potmesil, M., Bo, X., Thao, T. P., & Potmesilova, P. (2020). *A review of research on professional burnout of special pedagogues in China. European Proceedings of International Conference on Education and Educational Psychology*.
- Liu, C., Ahmad, N., Jiang, M., & Arshad, M. Z. (2024). Steering the path to safer food: The role of transformational leadership in food services to combat against foodborne illness. *Journal of Retailing and Consumer Services*, 81, Article 103958.
- Madigan, D. J., & Kim, L. E. (2021). Towards an understanding of teacher attrition: A meta-analysis of burnout, job satisfaction, and teachers' intentions to quit. *Teaching and Teacher Education*, 105, Article 103425.
- Maslach, C., & Leiter, M. P. (2016). Understanding the burnout experience: Recent research and its implications for psychiatry. *World Psychiatry*, 15(2), 103–111.
- McGrew, J., Ruble, L., Cormier, C. J., & Dueber, D. (2023). Special educators' mental health and burnout: A comparison of general and teacher specific risk factors. *Teaching and Teacher Education*, 132, Article 104209.
- Menegazzo, J. S., Cruz-Ortiz, V., Ortega-Maldonado, A., & Salanova, M. (2015). Positive institutions and their relationship with transformational leadership, empathy and team performance. *Multidisciplinary Journal for Education, Social and Technological Sciences*, 2(2), 38–64.
- Michel, J. W., Wallace, D. L., & Rawlings, R. A. (2013). Charismatic leaders: The role of admiration and system justification. *Leadership and Organization Development Journal*, 34(5), 469–487.
- Miller, M. (2009). Transformational leadership behaviours and empathy with action. *Transformation*, 26(1), 45–59.
- Murtaza, S. A., Mahmood, A., Saleem, S., Ahmad, N., Sharif, M. S., & Molnár, E. (2021). Proposing stewardship theory as an alternate to explain the relationship between CSR and employees' pro-environmental behavior. *Sustainability*, 13(15), Article 8558.
- Nwosu, K. C., Wahl, W., Cassim, H., Anierobi, E. I., Akuneme, C. C., & Okwuduba, E. N. (2021). Teacher self-concept and its association with willingness to include children with special needs in regular classes: Teacher empathy as a mediator. *Journal of Educational and Social Research*, 11(2), 47. <https://doi.org/10.36941/jesr-2021-0029>
- Obliopas, R., Afafe, F., & Rivera, J. (2020). Cognitive empathy and leadership performance of middle level educational managers in a state university. *Indian Journal of Science and Technology*, 13(05), 576–586.
- Park, E.-Y., & Shin, M. (2020). A meta-analysis of special education teachers' burnout. *SAGE Open*, 10(2), Article 2158244020918297.
- Pavlidou, K., Alevriadou, A., & Antoniou, A.-S. (2022). Professional burnout in general and special education teachers: The role of interpersonal coping strategies. *European Journal of Special Needs Education*, 37(2), 191–205.
- Peng, J., Samad, S., Comite, U., Ahmad, N., Han, H., Ariza-Montes, A., & Vega-Muñoz, A. (2022). Environmentally specific servant leadership and employees' energy-specific pro-environmental behavior: Evidence from healthcare sector of a developing economy. *International Journal of Environmental Research and Public Health*, 19(13), Article 7641.
- Ran, N. (2024). A study of the relationship between burnout and social support among special education teachers in China. *Open Journal of Social Sciences*, 12(1), 360–373.
- Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organizational Behavior*, 25(3), 293–315.
- Sergey, B., Boris, K., & Nadiia, R. (2020). Mathematical Modeling and Simulation of Systems: Selected Papers of 14th International Scientific-Practical Conference, MODS, 2019 June 24–26. In *Modeling of empathy, emotional intelligence and transformational leadership to the project success*. Chernihiv, Ukraine.
- Skaalvik, E. M., & Skaalvik, S. (2017). Dimensions of teacher burnout: Relations with potential stressors at school. *Social Psychology of Education*, 20, 775–790.
- Smith, A. (2006). Cognitive empathy and emotional empathy in human behavior and evolution. *The Psychological Record*, 56(1), 3–21.
- Sunu, I. G. K. A. (2022). The impact of digital leadership on teachers' acceptance and use of digital technologies. *Mimbar Ilmu*, 27(2), 311–320.
- Sweetman, J., Spears, R., Livingstone, A. G., & Manstead, A. S. (2013). Admiration regulates social hierarchy: Antecedents, dispositions, and effects on intergroup behavior. *Journal of Experimental Social Psychology*, 49(3), 534–542.
- Tian, Y., & Guo, Y. (2024). How does transformational leadership relieve teacher burnout: The role of self-efficacy and emotional intelligence. *Psychological Reports*, 127(2), 936–956.
- Trauernicht, M., Oppermann, E., Klusmann, U., & Anders, Y. (2021). Burnout undermines empathising: Do induced burnout symptoms impair cognitive and affective empathy? *Cognition and Emotion*, 35(1), 185–192.
- Tsang, K. K., Du, Y., & Teng, Y. (2022). Transformational leadership, teacher burnout, and psychological empowerment: A mediation analysis. *Social Behavior and Personality: An International Journal*, 50(1), 1–11.
- United Nations. (2023). *Leaving no one behind-special education promotion practice of Xiaoshan District, Zhejiang Province, China*. United Nations. Retrieved May 28, 2025 from <https://sdgs.un.org/partnerships/leaving-no-one-behind-special-education-promotion-practice-xiaoshan-district-zhejiang#:~:text=collaboration%20of%20governments%20of%20all,made%20great%20strides%20in%20the>.
- Xu, L., Mohammad, S. J., Nawaz, N., Samad, S., Ahmad, N., & Comite, U. (2022). The role of CSR for de-carbonization of hospitality sector through employees: A leadership perspective. *Sustainability*, 14(9), Article 5365.
- Xue, Y., Ahmad, A., Han, H., & Lho, L. H. (2024). Healing the healers: The interplay of corporate social responsibility and leadership in the healthcare burnout epidemic. *Social Behavior and Personality: An International Journal*, 52(11), 1–14.
- Yu, H., Shabbir, M. S., Ahmad, N., Ariza-Montes, A., Vega-Muñoz, A., Han, H., ... Sial, M. S. (2021). A contemporary issue of micro-foundation of CSR, employee pro-environmental behavior, and environmental performance toward energy saving.

carbon emission reduction, and recycling. *International Journal of Environmental Research and Public Health*, 18(10), 5380.