





RESEARCH ARTICLE

The use of experimental designs to examine causality in authentic leadership: A scoping review

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Abstract

Authentic leadership studies are often criticised for the limited use of causally defined research designs. To advance scholarship in this area, this article presents a scoping review on the use of experimental designs to examine causality in authentic leadership. Eleven publications were identified, which presented 16 experiments that met the inclusion criteria. Generally, these experiments tested authentic leadership as an antecedent; were conducted online; used a one-factor design; involved large samples, typically of working adults or residents; involved a manipulation check; involved the use of written vignettes to manipulate levels of authentic leadership; included counterfactual conditions; culminated with outcomes pertaining to followers; and established the causal effects of authentic leadership on the outcome(s) of interest. These findings suggest the value of: written vignettes; multi-method approaches; and online experiments. They also highlight opportunities to advance authentic leadership research through the use of sequential experiments and immersive technologies.

Keywords Leadership; authentic leadership; experimental research; scoping review; causality

Introduction

While different research designs are required to advance scholarship (Leavy, 2017), experiments are the gold standard to establish causality (Eden, 2017; Lonati, Quiroga, Zehnder, & Antonakis, 2018) – this is largely because their high level of control and internal validity serve to isolate cause-and-effect relationships (Podsakoff & Podsakoff, 2019). By manipulating a single discrete variable in a controlled environment, researchers can exclude confounding variables and competing explanations, such that only the manipulated variable can affect other phenomena under investigation (Randolph-Seng & Gardner, 2013).

Despite the value of, and increased interest in the experimental design, it is underused in leadership research (Antonakis, Bendahan, Jacquart, & Lalive, 2014; Eden, 2021; Gardner et al., 2020; Rietzschel, Wisse, & Rus, 2017) – this extends to authentic leadership research, where field surveys and correlational designs dominate. For instance, following their ‘review of the literature,’ Gardner and colleagues (2011, p. 1141) observed that ‘cross-sectional, non-experimental designs ... dominant.’ And it appears that little has changed, with Gardner and colleagues (2021) more recently noting the relative dearth of experimental designs in authentic leadership research.

The limited use of the experimental design can constrain understandings of authentic leadership. This is because correlational designs are unable to draw causal inferences about theorised relationships. While the experimental design can isolate variables and determine their direct effects on

outcomes, correlational designs primarily identify relationships between variables without establishing causality (Antonakis, Bendahan, Jacquart, & Lalive, 2010) – additionally, the potential for confounding variables in correlational designs remains high, further muddying the waters. As such, relying on correlational designs can hinder what is known about authentic leadership behaviours and their impact on organisational outcomes.

The reliance on correlational designs can also thwart opportunities to theorise authentic leadership (Fischer, Dietz, & Antonakis, 2024). Without experimental evidence, theoretical advancements might be based on assumptions rather than empirical validation. This can perpetuate the use of models that are not optimally aligned with the realities of organisational dynamics. As a result, interventions based on these models might be less effective, undermining efforts to foster authentic leadership within organisations.

The apprehension around experimental designs might stem from a misunderstanding about their basic characteristics and their limitations (Podsakoff & Podsakoff, 2019). They might be perceived as lacking external validity or generalisability, such that the controlled environments typical of experiments do not reflect the complex and dynamic nature of organisational settings (Lonati et al., 2018). Consequently, some might suggest that the findings from experimental designs cannot be applied to actual workplace scenarios.

A second, related concern is the perceived lack of realism in experimental research. Critics have argued that the artificial nature of experiments, where variables are manipulated in a controlled setting, does not accurately capture the nuances of authentic leadership in practice (Fischer et al., 2024). The leadership behaviours observed in experiments might differ from those in actual organisational contexts.

A third concern is that of ethics (Podsakoff & Podsakoff, 2019). Manipulating leadership behaviours and randomly assigning participants to different experimental conditions might raise ethical questions, particularly in organisational settings. Researchers might be concerned about the potential impact on participant wellbeing and the ethical implications of such manipulations.

Notwithstanding the aforesaid apprehensions, because the limited use of experimental designs in authentic leadership research can impede the field's growth, some scholars have encouraged their use (Sidani & Rowe, 2018). For example, Gardner and colleagues (2011, p. 1141) suggested that experimental designs in authentic leadership research can 'facilitate strong inferences about the causal relationships among leadership constructs ... [and] identify potentially positive effects of authentic leadership that could accrue for individuals, groups, and organizations under the right circumstances.' Similarly, experimental designs can serve to operationalise authentic leadership (Gardner et al., 2021).

While the calls for more experimental designs are instructive, there is limited clarity on how they have been used to examine causality in authentic leadership. Specifically, to the authors' knowledge, research is yet to describe how experimental designs have been deployed, as well as methodological trends and gaps. As such, while a generic call for more experimental designs might be helpful, there is likely to be greater value in research that learns from and builds on previous studies.

To advance scholarship on authentic leadership, this article describes the use of experimental designs to examine causality in authentic leadership. This is achieved through a scoping review.

This article is structured as follows. It starts with a brief introduction of authentic leadership, then describes and justifies the method and presents the results. The article concludes by discussing the key findings and explicating the associated implications for scholars, managers, and practitioners.

Authentic leadership

Authentic leadership has gained significant attention in the discipline of management as a contemporary leadership theory (Avolio & Walumbwa, 2014). It emphasises leaders' integrity and consistency with their core values, promoting genuine relationships and ethical decision-making.

Authentic leadership is rooted in the idea that leaders who remain true to their beliefs and values can positively influence their followers and foster a culture of trust and engagement within organisations (Iszatt-White & Kempster, 2019).

A dominant understanding of authentic leadership is that of Peus and colleagues (2012, p. 332) – or variations of. They suggested that authentic leaders ‘are guided by sound moral convictions and act in concordance with their deeply held values, even under pressure; they are keenly aware of their views, strengths, and weaknesses, and strive to understand how their leadership impacts others.’ Correspondingly, there appears to be broad consensus that authentic leadership comprises four dimensions, including self-awareness, an internalised moral perspective, balanced processing, and relational transparency (Gardner *et al.*, 2011). Self-awareness involves understanding one’s emotions, motives, and values, while an internalised moral perspective refers to making decisions that align with one’s ethical beliefs. Balanced processing denotes the ability to objectively analyse information and consider multiple perspectives, and relational transparency involves openly sharing thoughts and feelings with others, fostering trust and openness (Gardner, Avolio, Luthans, May & Walumbwa, 2005).

The appeal of authentic leadership aligns with the appeal of ethical and trustworthy leaders (Soderberg & Romney, 2022). As organisations navigate complex global challenges and face stakeholder scrutiny, the need for leaders who demonstrate integrity and transparency has become critical (Gardner *et al.*, 2011). Authentic leadership addresses this need by promoting values-based leadership that prioritises ethical decision-making and genuine relationships with followers. This approach is particularly relevant in today’s business environment, where trust and integrity are essential for building sustainable organisations.

The popularity of authentic leadership theory is further supported by its connection to self-determination theory (Deci & Ryan, 2000). Authentic leadership can positively affect desirable follower outcomes by fulfilling the basic psychological needs of autonomy, competence, and relatedness. Authentic leaders can foster autonomy by encouraging followers to participate in decision-making processes, which empowers them and enhances their intrinsic motivation and engagement. They support followers’ competence by offering constructive feedback and opportunities for skill development, helping followers build confidence and effectiveness in their roles; this in turn can validate their professional identities (DeRue & Ashford, 2010). By promoting open communication and demonstrating genuine concern for follower wellbeing, authentic leaders fulfil the need for relatedness, creating a sense of belonging and trust within the team.

Despite its growing acceptance, authentic leadership faces criticism and debate. Critics argue that the concept of authenticity might conflict with a leader’s roles within organisations. Alvesson and Einola (2019) contended that the ideal of authentic leadership might be difficult to achieve due to the social and political conventions inherent in organisational life. They suggested that the demands placed on leaders to influence others and align follower values with their own can create tension between being authentic and fulfilling leadership roles. Authentic leadership also risks conflating authenticity with sincerity and honesty, which are distinct (Trilling, 2009). Sincerity involves portraying oneself accurately to others, while authenticity involves being true to oneself (Avolio & Gardner, 2005).

Proponents of authentic leadership have asserted that striving for authenticity is a worthwhile endeavour, even if it is not always fully attainable (Gardner *et al.*, 2011). They have argued that the pursuit of authenticity and authentic leadership can lead to personal and professional growth, enhancing wellbeing and performance. Organisations that foster authentic leadership can benefit from leaders and followers working together to align values and goals, improving decision-making and building strong relationships (Gardner *et al.*, 2005). By encouraging open communication, mutual respect, and ethical behaviour, authentic leadership offers a way to create a positive and productive organisational culture (Walumbwa, Avolio, Gardner, Wernsing, & Peterson, 2007). A comprehensive review of authentic leadership theory can be sourced within this special issue.

Method

The aim of this review was to ‘identify and map the breadth of evidence’ (Munn et al., 2022, p. 951) on how experimental designs have been used to examine authentic leadership. A scoping review was appropriate for three key reasons. First, authentic leadership is ill-defined, whereby there is no universal understanding of it (cf. Alvesson & Einola, 2019; Gardner & McCauley, 2022). Second, in their critique of authentic leadership studies, Alvesson and Einola (2019, p. 390) argued that the evidence is scant. Specifically, they observed:

An overreliance on survey measures, cross-sectional designs, and single source data, and an almost complete lack of causally identified studies, qualitative studies other than in the positivist tradition... limit[ing] the possibility to develop the field further through in-depth understandings, either through longitudinal or (field) experimental research.

Third, a scoping review typically precedes a systematic review, which in turn can ‘Produce statements to guide decision-making’ (Munn et al., 2018, p. 2). For these reasons, a scoping review was conducted to describe publications that report on the use of experimental designs to examine authentic leadership.

The scoping review addressed the overarching question: how have experimental designs been used to examine the causal effects of authentic leadership? It was conducted in accordance with the JBI methodology for scoping reviews (Peters et al., 2020) and reported using the preferred reporting items for systematic reviews and meta-analyses extension for scoping reviews (PRISMA-ScR) (Tricco et al., 2018). Accordingly, the overarching question served to clarify the concepts of interest – namely, authentic leadership and experimental designs. Thus, publications that reported the use of experimental designs to examine authentic leadership were considered, irrespective of participant group or study context.

After searching Business Source Complete (EBSCOhost) to ensure comparable reviews had not been published, search strategies were devised for Business Source Complete (EBSCOhost), APA PsycInfo (EBSCOhost), and ABI/INFORM Collection (ProQuest), given the relevance of these databases. To optimise the pertinence of the identified publications, the term, ‘authentic leadership,’ was searched in publication titles and abstracts across all three databases. Furthermore, the term was also searched in other relevant search fields (Business Source Complete: KW and SU; APA PsycInfo: SU, MJ Word in Major Subject Heading, and MA MeSH Subject Heading; and ABI/INFORM Collection: MainSubject) – this approach served to expand the search, while remaining focused on authentic leadership.

To optimise comprehensiveness, all publications were considered, irrespective of language or publication date, as was grey literature (e.g., theses, conference abstracts). When a publication was in a language other than English that the reviewers were unable to readily translate, Google Translate was used to translate titles and abstracts, in the first instance; and the full-text, thereafter, as required.

Following the deployment of the search strategies (on March 6, 2024), all identified citations were collated and uploaded to EndNote (The EndNote Team, 2013) and duplicates, removed. Titles and abstracts were then imported into the online platform, Covidence, and screened by two reviewers, independently, with reference to the inclusion criteria – namely: an intervention was used (broadly defined); and authentic leadership was manipulated. In accordance with the focus of this scoping review, these criteria served to ensure that: ‘an intervention [was] ... deliberately introduced to observe its effects’ (Shadish, Cook, & Campbell, 2002, p. 12) on at least one dependent variable; and authentic leadership was manipulated as an explanatory variable (i.e., an independent variable, a mediator, or a moderator). While these criteria were important to address the overarching question, they limited the review in two ways. First, they excluded publications that reported on observational studies or qualitative research without an

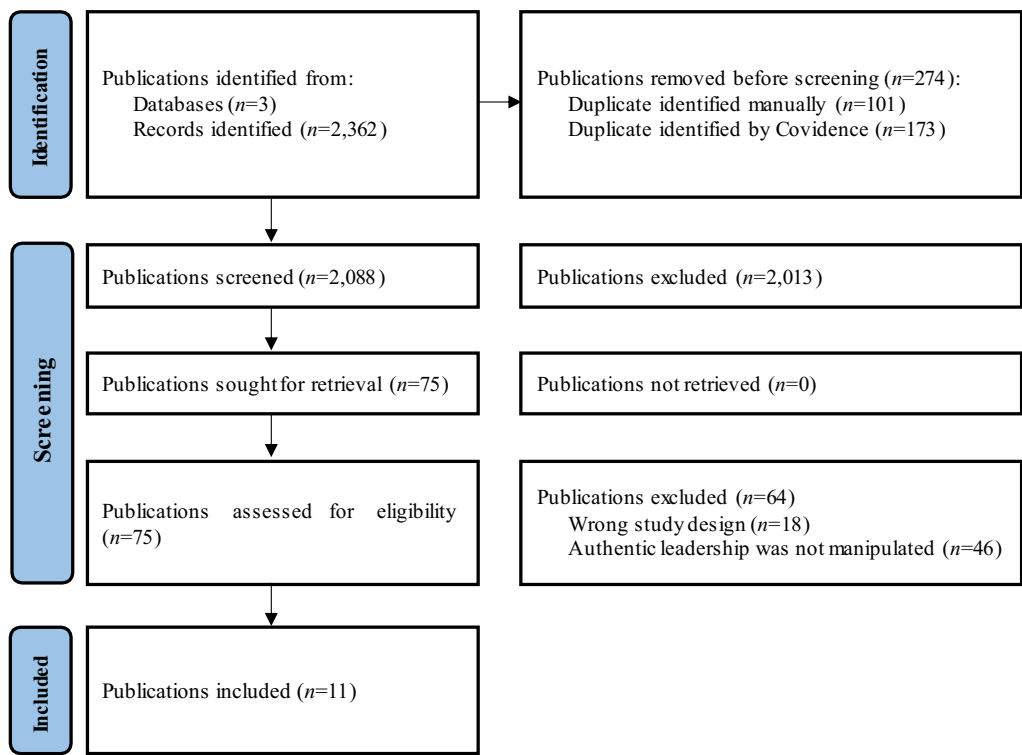


Figure 1. PRISMA flowchart.

intervention, thereby omitting alternative research designs that aided understandings authentic leadership. Second, the inclusion criteria excluded publications that reported on investigations of authentic leadership that naturally occurred in organisations without an intentional manipulation.

When it was unclear whether a publication met the inclusion criteria (for example, Haas, Braun, & Frey, 2016), the publication was excluded for consistency. For potentially relevant publications, the full-text was then imported into Covidence and assessed against the inclusion criteria by two reviewers, independently. Reasons for excluding full-text publications that did not meet the inclusion criteria were reported. Discrepancies were reconciled with another reviewer.

Data were extracted from relevant publications by two reviewers, independently, using a data extraction tool that the reviewers developed. Disagreements that arose between the reviewers were resolved through discussion with a third reviewer.

The data extracted from each included publication were tabulated and presented in diagrammatic form. This served to present an overview of the publications, transparently and succinctly, with reference to the key items of the data extraction tool. The tables and diagrams were accompanied by a narrative to describe how experimental designs have been used to examine authentic leadership, and ultimately clarify how the results relate to the review question. As a scoping review, a quality assessment of the publications was not required (Grant & Booth, 2009) – as such their content was not critically analysed.

Of the 2,362 publications identified, 2,088 were screened after duplicates were removed (see Figure 1). Of these, the full-text of 75 publications was assessed to determine eligibility – this served to identify 11 publications that were eligible for inclusion.

Results

Publication details

The 11 publications were issued between 2013 and 2024, inclusive, with the greatest proportion issued in 2023 (Appels, 2023; Johnson, Bluhm, Hannah, Avolio, & Lester, 2023; Malloy, Kavussanu, & Mackman, 2023; Zhu, Long, Liu, Shu, & Chen, 2023). While most of the publications were journal articles, one was a doctoral thesis (McKee, 2015). The ten journal articles were largely published in management journals (Appels, 2023; Braun & Peus, 2018; Braun, Peus, & Frey, 2018; Cianci, Hannah, Roberts, & Tsakumis, 2014; Johnson et al., 2023; Monzani, Ripoll, & Peiró, 2015; Zhu et al., 2023); however, some were published in psychology journals (Lagowska, Sobral, Jacob, Hafenbrack, & Goldszmidt, 2024; Malloy et al., 2023; Monzani, Ripoll, & Peiró, 2014). The journals might largely be deemed, high-quality – this is because all except one (Malloy et al., 2023) had a Scimago quartile ranking of one, and all had a five-year impact factor that was greater than one, according to the Journal Citation Reports.

Among the 11 publications, the largest proportion was conducted in Europe (Braun & Peus, 2018; Braun et al., 2018; Malloy et al., 2023; Monzani et al., 2014, 2015) and the United States of America (Appels, 2023; Cianci et al., 2014; Johnson et al., 2023; McKee, 2015). This suggests that experimental studies on authentic leadership are primarily concentrated in Western nations with limited presentation of other nations, particularly developing nations (see Table 1).

Five publications included one study (Cianci et al., 2014; Malloy et al., 2023; McKee, 2015; Monzani et al., 2014, 2015), while the remaining six included more than one study, with four publications presenting multiple studies (Appels, 2023; Braun et al., 2018; Johnson et al., 2023; Lagowska et al., 2024). Four publications also included a field survey (Appels, 2023; Braun & Peus, 2018; Johnson et al., 2023; Zhu et al., 2023), with two of these presenting multi-method and multi-experiment approaches (Appels, 2023; Johnson et al., 2023). Additionally, one publication presented a causal chain design involving three sequential experiments (Johnson et al., 2023).

Understandings of authentic leadership

When articulating an understanding of authentic leadership, the 11 publications referred to the definitions offered by Avolio (2005, 2017), Gardner and colleagues (2005), and/or Walumbwa and colleagues (2007). This suggests the publications largely understood authentic leadership as comprising four dimensions – namely, self-awareness, balanced processing, transparent relationships, and an internal moral compass. The aforesaid references were complemented with others (Ilies, Morgeson, & Nahrgang, 2005; Neider & Schriesheim, 2011).

Experimental conditions

The 11 publications collectively presented 16 experiments that met the inclusion criteria. Nine publications included one eligible experiment, whereby authentic leadership, as an explanatory variable, was manipulated and two included more than one experiment involving authentic leadership treatments – specifically, Braun and colleagues (2018) presented three experiments, and Lagowska and colleagues (2024) presented four.

Guided by Rietzschel and colleagues' (2017) categorisation of field, laboratory, and online experiments, eight of the 16 experiments were conducted online (Appels, 2023; Braun & Peus, 2018; Braun et al., 2018; Johnson et al., 2023; McKee, 2015; Zhu et al., 2023); four were conducted in a laboratory, all of which involved university students (Cianci et al., 2014; Malloy et al., 2023; Monzani et al., 2014, 2015); and Lagowska and colleagues (2024) conducted the remaining four in the field. The greater prevalence of online experiments reflects their increasing use in the related fields of psychology and economics (Parigi, Santana & Cook, 2017; Prissé & Jorrat, 2022). While they can unhelpfully increase heterogeneity within samples and reduce control over experimental conditions (Manago, Mize, &

Table 1. Scoping review summary (publications = 11; experiments = 16)

Publication	Journal and Metrics	Country	Relevant Study	Experimental Design	Participants	Authentic Leadership Manipulation	Manipulation Materials	Manipulation Checks	Dependent Variables
1. Appels (2023)	Journal of Management (Scimago Q1, 5-yr IF: 17.3)	United States of America	Study 1	Online, 2 × 3 between-subjects	Users of online labor platform (n = 302)	Levels of authentic leadership: low versus high versus no manipulation-of-mediator	Written vignettes (adapted from Cianci et al., 2014)	Pretest with a different sample	Employer attractiveness (jobseeker evaluations of the employer)
2. Braun and Peus (2018)	Journal of Business Ethics (Scimago Q1, 5-yr IF: 8.1)	Germany	Study 2	Online, one-factor between-subjects	Working adults (n = 154)	Levels of authentic leadership: low versus high versus a neutral control condition	Written vignettes (adapted from Cianci et al., 2014)	Within the experiment	Leaders' work-life balance, followers' work-life balance, and job satisfaction
3. Braun and colleagues (2018)	Organizational Behavior & Human Decision Processes (Scimago Q1, 5-yr IF: 6.0)	Germany	Study 2	Online, one-factor within subjects	Working adults (n = 145)	Levels of authentic leadership: low versus high	Leadership profile comparisons	Pretest using expert rating	Followers' attributions of leader gender
			Study 3	Online, one-factor between-subjects	Working adults (n = 97)	Levels of authentic leadership: low versus high versus a neutral control condition	Written vignettes (adapted from Cianci, Hannah, Roberts, & Tsakumis, 2014)	Within the experiment	Followers' attributions of leader gender, using two measures: leader names and hobbies
			Study 4	Online, one-factor between-subjects	Working adults (n = 227)	Levels of authentic leadership: low versus high versus control versus consideration	Written vignettes (adapted from Cianci et al., 2014)	Within the experiment	Followers' attributions of leader gender, using two measures: leader names and hobbies
4. Cianci and colleagues (2014)	Leadership Quarterly (Scimago Q1, 5-yr IF: 11.7)	United States of America	Study 1	Laboratory, 3 × 2 between-subjects	Students (n = 118)	Levels of authentic leadership: low versus high versus neutral	Written vignettes	Within the experiment	Followers' ethical decision-making and guilt appraisals

(Continued)

Table 1. (Continued.)

Publication	Journal and Metrics	Country	Relevant Study	Experimental Design	Participants	Authentic Leadership Manipulation	Manipulation Materials	Manipulation Checks	Dependent Variables
5. Johnson and colleagues (2023)	Human Performance (Scimago Q1, 5-yr IF: 3.2)	United States of America	Study 2a	Online, one-factor between-subjects	Fulltime workers (n = 249)	Levels of authentic leadership: low versus high	Written vignettes	Within the experiment	Followers' organization identity, role clarity, and follower psychological capital
6. Lagowska and colleagues (2024)	Journal of Applied Psychology (Scimago Q1, 5-yr IF: 11.8)	Brazil	Study 1	Field, 2 × 1 between-subjects	Favela residents (n = 47)	Leadership styles: authentic versus ethical	Leader scripts, delivered by a trained actor	Within the experiment	Followers' stereotype threat
			Study 2	Field, 2 × 1 between-subjects	Favela residents (n = 55)	Leadership styles: authentic versus ethical	Leader scripts, delivered by a trained actor	Within the experiment	Followers' stereotype threat
			Study 3	Field, 2 × 2 between-subjects	Favela residents (n = 207)	Leadership styles: authentic versus ethical	Written vignettes, adapted from studies 1 and 2	Within the experiment	Followers' stereotype threat (proximal outcome) and willingness to apply for a job (distal outcome)
			Study 4	Field, 2 × 2 between-subjects	Favela residents (n = 154)	Leadership styles: authentic versus ethical	Written vignettes, adapted from studies 1 and 2	Within the experiment	Followers' stereotype threat (proximal outcome) and willingness to apply for a job (distal outcome)

(Continued)

Table 1. (Continued.)

Publication	Journal and Metrics	Country	Relevant Study	Experimental Design	Participants	Authentic Leadership Manipulation	Manipulation Materials	Manipulation Checks	Dependent Variables
7. Malloy and colleagues (2023)	Sport, Exercise, and Performance Psychology (Scimago Q1, 5-yr IF: 3.4)	United Kingdom	Study 1	Laboratory, one-factor between subjects	Students (<i>n</i> = 129)	Levels of authentic leadership: low versus high versus neutral	Written vignettes (adapted from Cianci <i>et al.</i> , 2014)	Within the experiment	Trust, enjoyment and commitment, cheating and aggression, and anticipated guilt
8. McKee (2015)	Dissertation Abstracts International Section A: Humanities and Social Sciences	United States of America	Study 1	Online, 2 × 2 × 2 between-subjects	Students (<i>n</i> = 220)	Leadership styles: authentic versus transformational	Written vignettes	Within the experiment	Affective commitment, organisational citizenship behaviour, satisfaction, wellbeing, and performance
9. Monzani and colleagues (2014)	Psicothema (Scimago Q1, 5-yr IF: 4.4)	Spain	Study 1	Laboratory, one-factor between-subjects	Students (<i>n</i> = 224)	Leadership styles: authentic versus transactional	Multimedia videos and computer software	Not included	Followers' loyalty toward the leader
10. Monzani and colleagues (2015)	European Journal of Work & Organizational Psychology (Scimago Q1, 5-yr IF: 5.8)	Spain	Study 1	Laboratory, one-factor between-subjects	Students (<i>n</i> = 228)	Leadership styles: authentic versus transactional	Multimedia videos and computer software	Within the experiment	Followers' work result satisfaction and task performance
11. Zhu and colleagues (2023)	Leadership & Organization Development Journal (Scimago Q1, 5-yr IF: 5.3)	China	Study 2	Online, one-factor between subjects	Fulltime working adults (<i>n</i> = 130)	Levels of authentic leadership: low versus high	Written vignettes (adapted from Cianci <i>et al.</i> , 2014)	Within the experiment	Followers' resistance to change

Doan, 2021), they can enable leadership scholars to expand the boundaries of the ‘organization’ (Eden, 2021).

Experimental design

Seven experiments used a factorial between-subjects experimental design (Appels, 2023; Cianci et al., 2014; Lagowska et al., 2024; McKee, 2015). The remaining nine used a one-factor design, with eight involving a between-subjects design (Braun & Peus, 2018; studies 3 and 4 in; Braun et al., 2018; Johnson et al., 2023; Malloy et al., 2023; Monzani et al., 2014, 2015; Zhu et al., 2023), and one, a within-subjects conjoint design (study 2 in Braun et al., 2018) – while some consider experimental designs to include conjoint designs (Mize & Manago, 2022), it should be noted that this is a contested view (Aguinis & Lawal, 2012).

Factorial designs, which manipulate multiple independent variables, enable researchers to examine the separate effects of each independent variable (that is, the main effects), as well as their combined effects (that is, the interaction effects) on the dependent variable (Rietzschel et al., 2017; Rogers & Révész, 2019). Moreover, such designs can mitigate social desirability bias by simultaneously controlling the influence of multiple factors, making it difficult for participants to predict the desired response (Mize & Manago, 2022). Generally, factorial designs involve more treatment conditions – this is because each combination of the different levels of multiple independent variables constitutes a condition in the experiment; this can make it suitable to test complex leadership models. As Rietzschel and colleagues (2017, p. 61) noted, by independently manipulating single, specific predictors in a factorial design, ‘these studies are informative in not just showing whether certain leadership behaviors are effective ... but also identifying boundary conditions for those benefits.’ However, the complexity of factorial designs can be challenging in non-laboratory settings where it is difficult to control independent or extraneous variables (Podsakoff & Podsakoff, 2019). This might partly account for the greater use of one-factor, rather than factorial designs in authentic leadership experiments.

Fourteen of the 16 experiments manipulated authentic leadership as an antecedent variable; the two remaining experiments manipulated authentic leadership as a mediator (Appels, 2023) or moderator (Cianci et al., 2014). This suggests that experimental designs to examine causality in authentic leadership have largely investigated the effects of authentic leadership as an independent variable.

Experimentally manipulating the mediator to test causal mediating mechanisms can be challenging, thus requiring complicated experimental designs (Imai, Tingley, & Yamamoto, 2013; Pirlott & MacKinnon, 2016). For instance, Appels (2023) adopted a parallel design, combining a measurement-of-mediation design with a concurrent double randomisation manipulation-of-mediator design. The design involved two sequential experiments whereby authentic leadership was manipulated as a mediator in the concurrent double randomisation experiment. Johnson and colleagues (2023) adopted a different type of manipulation-of-mediator design – namely, a causal chain design (Stone-Romero & Rosopa, 2010), also called a double randomisation design (Pirlott & MacKinnon, 2016). They conducted three experiments involving multiple mediators. Authentic leadership was manipulated as an antecedent variable and its effects on the proximal mediators (organisational identification and role clarity) were assessed. While the parallel and causal chain designs can demonstrate the causality of mediating effects (Pirlott & MacKinnon, 2016; Spencer, Zanna, & Fong, 2005), they differ. The parallel design consists of two experiments, and ‘each subject is randomly assigned to one of two experiments; in one experiment only the treatment variable is randomized whereas in the other both the treatment and the mediator are randomized’ (Imai et al., 2013, p. 6). However, the causal chain design involves separate sequential experiments where causal mediation analysis is applied to each single experiment.

While the 14 experiments that positioned authentic leadership as an antecedent variable were conducted in an array of settings – both online (Braun & Peus, 2018; Braun et al., 2018; Johnson et al., 2023; McKee, 2015; Zhu et al., 2023) and offline (Lagowska et al., 2024; Malloy et al., 2023; Monzani et al., 2014, 2015) – an examination of these experiments revealed three key patterns. First,

with two exceptions (Braun *et al.*, 2018; Monzani *et al.*, 2014), they all involved a manipulation check within the experiment. Second, they largely involved the use of written vignettes (Braun & Peus, 2018; Braun *et al.*, 2018; Johnson *et al.*, 2023; Lagowska *et al.*, 2024; Malloy *et al.*, 2023; McKee, 2015; Zhu *et al.*, 2023) – the exceptions involved the use of leadership profiles (Braun *et al.*, 2018), leader scripts (Lagowska *et al.*, 2024), and multimedia videos (Monzani *et al.*, 2014, 2015). Third, the dependent variables largely included outcomes pertaining to followers (Braun *et al.*, 2018; Johnson *et al.*, 2023; Lagowska *et al.*, 2024; Monzani *et al.*, 2014, 2015; Zhu *et al.*, 2023).

Participants

Eleven experiments involved working adults or residents (Appels, 2023; Braun & Peus, 2018; Braun *et al.*, 2018; Johnson *et al.*, 2023; Lagowska *et al.*, 2024; Zhu *et al.*, 2023), while five involved university students (Cianci *et al.*, 2014; Malloy *et al.*, 2023; McKee, 2015; Monzani *et al.*, 2014, 2015). While the sample sizes ranged from 47 participants (study 1 in Lagowska *et al.*, 2024) to 302 participants (study 1 in Appels, 2023), most experiments involved 100 to 300 participants. Specifically, three experiments involved fewer than 100 participants, six involved between 100 and 200 participants, another six involved between 200 and 300 participants, and one involved over 300 participants. These larger samples parallel those found in other management and leadership studies (Aliluyani, Wong, & Cummings, 2018; Scandura & Williams, 2000).

Comparing the experimental settings, all eight online experiments involved the highest mean number of participants (191). This was followed by the four lab experiments (175), with the four field experiments involving the lowest mean number of participants (116). These patterns reflect research that suggests online experiments can serve to increase sample size (Manago *et al.*, 2021; Parigi *et al.*, 2017; Reips, 2000).

Of the 14 experiments in which participant mean age was reported, this ranged from 19.36 to 43.70 years (mean of means = 32.17 years). Of the 13 experiments in which the standard deviation of participant age was reported, this ranged from 1.57 to 14.39 years (mean of SD = 9.28 years). The four experiments involving university students that reported participant age indicated a younger mean age (24.19 years), than the seven online experiments that involved working adults (37.29 years) and the three field experiments that involved residents that reported participant age (30.85 years). Additionally, the standard deviation of participating students (range = 1.57–8.6 years; mean of SD = 4.95 years) was smaller than the participating working adults (range = 9.21–14.39 years; mean of SD = 25.07 years) and participating residents (range = 10.49–12.54 years; mean of SD = 11.32 years). These differences potentially limit comparability between the cohorts.

Of the experiments that involved working adults, there was limited detail on the organisations or sectors they represented. For instance, Johnson and colleagues (2023, p. 232) limited their description to ‘One hundred participants who live[d] in the U.S. [United States] and work[ed] full-time.’ Similarly, while some authors reported on the industries that their participants represented, these industries were not defined (Braun *et al.*, 2018). Consider, for instance, Zhu and colleagues (2023) who noted that the largest proportion of their participants were part of the ‘manufacturing industry’ – however, what this industry included or excluded was not apparent. This might be partly due to the heterogeneity of online samples, as all seven experiments with working adults were conducted online.

Manipulation checks

Of the 16 experiments, all but one involved a manipulation check (Monzani *et al.*, 2014). Of the 15 experiments that involved a manipulation check, eight involved an in-sample manipulation check using the authentic leadership questionnaire and the authentic leadership inventory to assess the manipulation of authentic leadership. One experiment also involved the use of the authentic leadership inventory as a manipulation check for its authentic leadership treatments during a pretest

with a different sample (Appels, 2023). Lagowska and colleagues' (2024) experiments involved a one-item binary manipulation check to assess whether respondents believed they interacted with an authentic leader or an ethical leader in the experiments. The authors pretested the validity of their leadership manipulations with a separate sample with a within-person design. Similarly, McKee (2015) tested their leadership manipulation check in a pilot study and then applied the improved measures in the experiment. Additionally, Braun and colleagues (2018, study 2) used expert rating in a pretest as a manipulation check. Overall, these findings suggest that the experiments largely performed manipulation checks within the experiment after measuring the dependent variable(s), with the authentic leadership questionnaire and the authentic leadership inventory commonly used to assess manipulation effectiveness.

The aforesaid findings do not appear to align with recommended research designs. In social science experiments, it is common to conduct a manipulation check after the dependent measures have been assessed (Mize & Manago, 2022). However, in leadership research, manipulation checks within the experiment, either before or after measuring the dependent variable(s), can lead to demand effects. Therefore, ideally, manipulation checks should be undertaken as part of a pilot study involving a different, comparable sample (Lonati et al., 2018; Podsakoff & Podsakoff, 2019; Schowalter & Volmer, 2023). A pretest of the treatment conditions enables researchers to improve the experiment manipulation before their primary study. More importantly, an 'external manipulation check' (Lonati et al., 2018, p. 22), using out-of-sample manipulation checks in a separate pilot test, can address the demand effects or effects that have already faded. Yet, this scoping review suggests that most experimental designs to examine causality in authentic leadership fell short of the recommended research designs.

Manipulation materials

To manipulate authentic leadership, 11 of the 16 experiments involved the use of a written vignette. Reflecting previous research (Schowalter & Volmer, 2023), those developed by Cianci and colleagues (2014) appear to have been particularly influential, as they were adapted for six other experiments (study 2 in Appels, 2023; study 2 in Braun & Peus, 2018; studies 3 and 4 in; Braun et al., 2018; Malloy et al., 2023; study 2 in Zhu et al., 2023). Cianci and colleagues developed scripts to reflect high, low, or neutral authentic leadership – the latter was 'a condition with no information regarding the follower's immediate supervisor – designed to elicit responses in the absence of authentic leadership' (p. 586).

Rather than use adaptations of Cianci and colleagues' (2014) materials, four experiments involved the use of novel written vignettes. For instance, in one experiment (study 2a in Johnson et al., 2023), participants read a vignette imagining they worked for a specific company and manager, and the manipulation treatment was a description of the manager's style as high or low in authentic leadership. Two other experiments involved the use of a brief description of a manager's leadership style, which was either authentic or ethical (studies 3 and 4 in Lagowska et al., 2024). And another experiment involved the use of eight different scenarios to manipulate transformational and authentic leadership (McKee, 2015).

Of the five remaining experiments (that did not involve the use of a written vignette), two manipulated ethical and authentic leadership by involving trained actors to deliver a scenario script (studies 1 and 2 in Lagowska et al., 2024). The actors played the role of a future supervisor and their speech was manipulated to create a scenario of ethical or authentic leadership.

Another two experiments involved videos and computer software to manipulate authentic and transactional leadership (Monzani et al., 2014, 2015). Both included: an initial manipulation in the form of a video of a chief executive officer delivering a welcome speech to participants in each condition; and the manipulation of leadership feedback style in the form of a commentary on the trial performance according to each leadership treatment.

The remaining experiment involved the use of 16 leadership profiles, whereby the four dimensions of authentic leadership – specifically, self-awareness, relational transparency, internalised moral perspective, and balanced processing – were manipulated by using a high and low condition (Braun

et al., 2018). This design provided 32 profiles in total for comparative value. As the authors described, participants were invited to complete 16 profile comparisons:

Each comparison consisted of two leader profiles presented side by side in random order. Each profile contained four statements representing the four dimensions of authentic leadership. Specifically, within a profile, each dimension of authentic leadership was varied to indicate either high or low levels of self-awareness, relational transparency, internalized moral perspective, and balanced processing (p. 134).

Manipulation treatments

All 16 experiments included counterfactual conditions, involving one of two types of manipulation treatment. Specifically, they either manipulated the level of authentic leadership or they compared authentic leadership with an alternative style. Each type is addressed in turn.

Nine experiments involved the manipulation of the level of authentic leadership, comparing high and low levels – of these, six included a control group. In one of these experiments, the control group received no treatment (Appels, 2023). Here, the experiment – a parallel design – entailed no manipulation of the mediator in one of two experiments – namely, authentic leadership attributions; in the other, the manipulation of the mediator was fixed to a high versus low value. A biased comparison can be created when an experiment does not include a control group or when a control group receives no intervention (Lonati *et al.*, 2018; Schowalter & Volmer, 2023). This is because it can be difficult to ascertain the true cause of an observed effect. As such, control groups should receive a neutral treatment, differing only in leadership behaviour and not in other aspects of the manipulation. This was reflected in the remaining five experiments in which the control group received a neutral treatment. For instance, in Cianci and colleagues' (2014, p. 586) experiment, the neutral treatment was 'a condition with no information regarding the follower's immediate supervisor – designed to elicit responses in the absence of authentic leadership.' Similarly, in the three experiments conducted by Braun and Peus (study 2 in 2018), as well as Braun and colleagues (studies 3 and 4 in 2018), the control groups did not receive further information about the leader. And Malloy and colleagues (2023) involved a control group that received a neutral script, devoid of references to authentic leadership behaviours.

Rather than manipulate the level of authentic leadership, seven of the 16 experiments compared authentic leadership with an alternative leadership style. The experiments involved manipulation treatments that presented participants with two contrasting leadership scenarios – the impact of authentic leadership on particular outcomes was compared with the impact of an alternative leadership style on these outcomes. For instance, Lagowska and colleagues' (2024) four experiments compared authentic leadership with ethical leadership, serving to differentiate the two. Similarly, Monzani and colleagues' (2014, 2015) two experiments compared authentic leadership with transactional leadership – they concluded that an authentic feedback style had a stronger effect on followers' loyalty, task performance, and work result satisfaction. And – in comparing non-transformational (authentic) leadership with non-authentic (transformational) leadership – McKee (2015) found no difference between the two.

Experiment results

Reflecting previous research (Podsakoff & Podsakoff, 2019; Schowalter & Volmer, 2023), most of the 16 experiments culminated with outcomes pertaining to followers – for instance, they considered how perceptions and behaviours of authentic leadership impacted followers. The dependent variables in these experiments included followers' wellbeing (e.g., work-life balance); job satisfaction (e.g., work satisfaction, enjoyment); positive attitudes or behaviour (e.g., organisational identification, organisational citizen behaviour, commitment, trust, loyalty to leader, ethical decision, willingness to apply for a job, employers' attractiveness); negative attitudes or behaviour (e.g., resistance to change, guilt,

cheating and aggression, stereotype threat); as well as capability and performance (e.g., role clarity, psychological capital, task performance).

Conversely, fewer experiments culminated with outcomes pertaining to leaders. The dependent variables in these experiments included leaders': work–life balance; and attributions of gender. For example, Braun and colleagues' (2018) three experiments suggested that authentic leadership was positively associated with attributions of being female.

Of the 16 experiments, nine explicitly established the causal effects of authentic leadership on the outcome(s) of interest. For example, Appels (2023, p. 2742) found 'participants attribute [authentic leadership] ... to activist ... [chief executive officers] ... and that this causally explains a substantial portion of any positive impact of ... [chief executive officers' sociopolitical activism] on employer attractiveness'. Similarly, Braun and Peus (2018, p. 887) reported that 'the experimental design allowed us to draw causal inferences about the positive impact of authentic leadership on all three dependent variables.' And Malloy and colleagues (2023, p. 37) claimed their research offered 'causal evidence for the positive effects of authentic leadership on trust, enjoyment, and commitment.'

Discussion

Despite recent advancements in the theoretical understandings of authentic leadership, few experimental designs have been used (Gardner et al., 2011, 2021). Instead, there has been a greater reliance on correlational designs. Nonetheless, some researchers have proposed causal relationships, discussing the results as consequential from leadership (Wulff et al., 2023). The scarcity of experimental authentic leadership studies suggests that caution should be exercised when interpreting much of the research findings on authentic leadership to date, given the limitations of correlational designs (Antonakis et al., 2010).

To address the criticism about 'weak empirical studies' in authentic leadership (Alvesson & Einola, 2019, p. 383), there have been calls for diverse methodologies, including experimental designs, to establish causal relationships in authentic leadership research (Banks, Gooty, Ross, Williams, & Harrington, 2018; Gardner et al., 2021; Sidani & Rowe, 2018). As such, this article presented findings of a scoping review to establish how experimental designs have been used to examine the causal effects of authentic leadership.

The review served to identify 11 publications, largely from the United States of America, which collectively presented 16 experiments that met the inclusion criteria. Generally, these experiments: tested authentic leadership as an antecedent; were conducted online; used a one-factor design; involved large samples, typically of working adults or residents; involved a manipulation check; involved the use of written vignettes to manipulate levels of authentic leadership; included counterfactual conditions; culminated with outcomes pertaining to followers; and established the causal effects of authentic leadership on the outcome(s) of interest.

This aforesaid landscape of experimental designs to examine causality in authentic leadership illuminates what is known as much as what remains unknown. For instance, with five (of 11) publications reporting on European studies, and four reporting on North American studies, there is limited evidence from elsewhere in the world. Similarly, the sole involvement of young and middle aged adults suggests there is much to learn about authentic leadership among much younger cohorts, including children, as well as much older cohorts, including retirees – this is particularly important given ageing populations, worldwide (WHO, 2022).

Despite the importance of the findings presented in this article, four methodological limitations warrant mention. First, given that the search only included the term, 'authentic leadership,' and excluded variations thereof, it is unlikely that all relevant publications were identified. For instance, publications about genuine leadership (Fultz, 2017) or the dimensions of authentic leadership – namely, 'self-awareness, internalized moral perspective, balanced processing and relational transparency' (Puni & Hilton, 2020, p. 369) – would not have been identified via the search strategy. Second, given varied understandings of what constitutes laboratory and field experiments, the way the

experiments were categorised for the purpose of this scoping review might differ to others' approach. Third, while the 16 experiments were categorised according to whether they culminated with outcomes pertaining to followers or leaders, others might have categorised the experiments differently. For instance, while employers' attractiveness was deemed to be an outcome pertaining to the followers who participated in the experiments (Appels, 2023), others might argue this to be an outcome pertaining to the leader (as the employer). Fourth, the findings presented in this article might be susceptible to publication bias (Harrison, Banks, Pollack, O'Boyle, & Short, 2017), whereby articles might be more likely to be published if they present positive results, leading to an overrepresentation of positive findings.

Notwithstanding the aforesaid limitations, the findings from this scoping review have implications for scholars, managers, and practitioners. For scholars, the findings highlight four key lessons to advance the scholarship of authentic leadership. First, there appears to be value in using written vignettes (Appels, 2023; Braun & Peus, 2018; Braun *et al.*, 2018; Cianci *et al.*, 2014; Johnson *et al.*, 2023; Lagowska *et al.*, 2024; Malloy *et al.*, 2023; McKee, 2015; Zhu *et al.*, 2023). Vignettes offer some control where researchers can present participants with scenarios depicting various leadership behaviours. These scenarios can be carefully crafted to reflect realistic and contextually relevant leadership behaviours, allowing researchers to study participant responses and evaluations. When written vignettes are used, participants can receive a series of scenarios describing different leadership behaviours. By standardising these scenarios across all participants, researchers can control for extraneous variables and focus on how participants attribute leadership qualities based on the behaviours presented. Although written vignettes might not reflect the complexities and subtleties of real-world interactions (Antonakis *et al.*, 2010), they allow causal relationships to be examined between attributed leadership and various outcomes, such as follower motivation, trust, and performance. For instance, to avert the methodological constraints and estimation biases often associated with correlational studies, it can be helpful to randomly assign participants to groups, providing one group with a vignette on high-level authentic leadership and the other with a vignette on low-level authentic leadership vignette; and compare mean effects between the groups (for guidance, see Aguinis & Bradley, 2014).

Despite their advantages, written vignettes are not a perfect solution. They typically manipulate perceptions or evaluations of behaviours, rather than the behaviours themselves (Fischer *et al.*, 2024). This distinction is crucial because behaviours and perceptions are not synonymous. Perceptions act as outcomes rather than independent variables, influenced by various factors that are not always accounted for in the experimental design. These omitted variables can skew results, leading to theoretical confounding (Sajons, 2020). This issue creates significant challenges in ensuring the validity of findings, as the unmeasured variables can introduce endogeneity problems that complicate estimation. Therefore, written vignettes present a helpful way forward for authentic leadership research, but require careful consideration of the inherent limitations in measuring true causal effects of leader behaviour (Antonakis *et al.*, 2010; Lonati *et al.*, 2018; Wulff *et al.*, 2023).

Second, there appears to be value in using multi-method approaches, combining field surveys with experimental designs (Braun & Peus, 2018; Johnson *et al.*, 2023; Zhu *et al.*, 2023). As Appels (2023, pp. 2735–2736) observed, while the 'experiments address issues of causality ... the field survey speaks to issues of generalizability.' This approach addresses the limitations of using one design – like a correlational design, which cannot demonstrate causal effects – or one method – like a written vignette, which can be 'challenged by threats to external validity' (Aguinis & Bradley, 2014, p. 351).

Third, there is likely to be value in conducting online experiments. Online platforms can help to extend the reach of research, ease participation, and diversify participants (Buso *et al.*, 2021; Prissé & Jorrat, 2022). However, online experiments are not without methodological or ethical challenges (Benbunan-Fich, 2016) – for instance, in addition to the prospect of 'threaten[ing] several major types of validity' (Newman, Baviak, Mount, & Shao, 2021, p. 1383), it can be difficult to ensure participant identity and their informed consent.

While the three aforesaid lessons speak to what the scoping review found, the fourth lesson pertains to five opportunities that remain underused to advance authentic leadership research. First, given the reliance on working adults or residents and students, largely from Western nations, there is a need to diversify the participants and the cultural and organisational contexts they are part of. Such diversity would aid the generalisability of the findings. Second, given the predominance of cross-sectional experiments, there is an opportunity for longitudinal experiments to determine the long-term effects of authentic leadership. Such research could establish causal relationships over time and offer a deeper understanding of the dynamics involved. Third, given the reliance on individual outcomes, scholars might consider the prospect of establishing experimental outcomes at the team or organisational levels. Fourth, given the demonstrated interest in manipulating authentic leadership as an antecedent variable, there is a need for additional experiments to manipulate authentic leadership as a mediator or moderator. Fifth, while other fields have found value in sequential experiments to establish causal chains (Bai, Xu, Yang, & Guo, 2023), and/or immersive technologies to increase the realism of experimental conditions (Innocenti, 2017), with few exceptions (Johnson et al., 2023), authentic leadership researchers have made limited use of these. This points to opportunities that might warrant consideration; as such, each is briefly addressed in turn.

Sequential experiments involve the examination of various cause-and-effect relationships in separate experiments as stages (e.g., from the predictor to the mediator and from the mediator to the effect) (Fischer, Dietz, & Antonakis, 2016). This approach enables researchers to exogenously manipulate variables that would otherwise be influenced by internal factors, hence addressing endogeneity issues (Antonakis et al., 2010). Additionally, sequential experiments can help to establish causal chains, providing particularly strong evidence for mediating effects (Eden, Stone-Romero, & Rothstein, 2015; Spencer et al., 2005). Furthermore, Podsakoff and Podsakoff (2019) noted that sequential experiments can minimise the potential for common source biases because the mediating variable and dependent variable are not obtained from the same source in such experiment design.

Relative to other manipulation materials, like written vignettes, immersive technologies can enhance experimental conditions and how experiments are conducted. For instance, they can offer: experimental control (Mol, 2019); experimental realism, thereby bolstering ecological validity (Bombari, Schmid Mast, Canadas, & Bachmann, 2015; Pan & Hamilton, 2018); the automatic collection of data that are otherwise difficult, including movement and rotation (Parsons, 2015); reproducibility (Blascovich et al., 2002); participants the opportunity to visualise complex problems (Patterson, Darbani, Zacharias, & Yazdizadeh, 2017); and researchers the opportunity to conduct experiments that might otherwise be prohibitive (Rosenberg, Baughman & Bailenson, 2013). Consider for example, the prospect of manipulating authentic leadership with immersive leader-follower interactions hosted in virtual reality, powered by generative artificial intelligence dialogues, and testing wellbeing outcomes with reference to heartrate, galvanic skin response, and cortisol swabs. As Harrison and colleagues (2011, p. 88) noted:

The potential benefit to experimental and behavioral research of utilizing virtual reality is that the cues provided are naturalistic, allowing respondents to get immersed in the task in ways that may not be possible using standard text and picture interactions.

While authentic leadership scholarship will benefit from different research designs (Leavy, 2017), the four key lessons from this review suggest there are considerable opportunities to harness the strengths and potential of experimental designs.

For managers and practitioners, the findings from this scoping review suggest two points. First, given the limited use of experimental designs in authentic leadership research, available evidence should be used with careful consideration. Second, to bolster the evidence-base, managers and practitioners are encouraged to call for strong research designs, and scrutinise offers to participate in authentic leadership studies to ensure that issues with the evidence-base are not exacerbated.

Conclusion

The findings from this scoping review establish how experimental designs have been used to examine the causal effects of authentic leadership. The 16 experiments across 11 publications demonstrate the value and feasibility of experimental designs to establish causal relationships and advance how authentic leadership is theorised. Specifically, they demonstrate the value of written vignettes; multi-method approaches; and online experiments. They also point to opportunities to advance authentic leadership research by using sequential experiments to establish causal chains and immersive technologies to increase the realism of experimental conditions.

Competing interests. The authors declare none.

References

- Aguinis H., & Bradley K. J. (2014). Best practice recommendations for designing and implementing experimental vignette methodology studies. *Organizational Research Methods*, 17(4), 351–371.
- Aguinis H., & Lawal S. O. (2012). Conducting field experiments using eLancing's natural environment. *Journal of Business Venturing*, 27(4), 493–505.
- Alilyyani B., Wong C. A., & Cummings G. (2018). Antecedents, mediators, and outcomes of authentic leadership in healthcare: A systematic review. *International Journal of Nursing Studies*, 83, 34–64.
- Alvesson M., & Einola K. (2019). Warning for excessive positivity: Authentic leadership and other traps in leadership studies. *Leadership Quarterly*, 30(4), 383–395.
- Antonakis J., Bendahan S., Jacquart P., & Lalive R. (2010). On making causal claims: A review and recommendations. *Leadership Quarterly*, 21(6), 1086–1120.
- Antonakis J., Bendahan S., Jacquart P., & Lalive R. (2014). Causality and endogeneity: Problems and solutions. In D. V. Day (Ed.), *The Oxford handbook of leadership and organizations* (pp. 93–117). Oxford: Oxford University Press.
- Appels M. (2023). CEO sociopolitical activism as a signal of authentic leadership to prospective employees. *Journal of Management*, 49(8), 2727–2765.
- Avolio B. J., & Gardner W. L. (2005). Authentic leadership development: Getting to the root of positive forms of leadership. *Leadership Quarterly*, 16(3), 315–338.
- Avolio B. J., & Walumbwa F. O. (2014). Authentic leadership theory, research and practice: Steps taken and steps that remain. In D. V. Day (Ed.), *The Oxford handbook of leadership and organizations* (pp. 331–356). Oxford: Oxford University Press.
- Avolio B. J., Wernsing T., & Gardner W. L. (2017). Revisiting the development and validation of the authentic leadership questionnaire: Analytical clarifications. *Journal of Management*, 44(2), 399–411.
- Bai J., Xu B.-X., Yang S.-L., & Guo -Y.-Y. (2023). Why are higher-class individuals less supportive of redistribution? The mediating role of attributions for rich-poor gap. *Current Psychology*, 42(20), 16883–16893.
- Banks G. C., Gooty J., Ross R. L., Williams C. E., & Harrington N. T. (2018). Construct redundancy in leader behaviors: A review and agenda for the future. *Leadership Quarterly*, 29(1), 236–251.
- Benbunan-Fich R. (2016). The ethics of online research with unsuspecting users: From A/B testing to C/D experimentation. *Research Ethics*, 13(3–4), 200–218.
- Blascovich J., Loomis J., Beall A. C., Swinsh K. R., Hoyt C. L., & Bailenson J. N. (2002). Immersive virtual environment technology as a methodological tool for social psychology. *Psychological Inquiry*, 13(2), 103–124.
- Bombardi D., Schmid Mast M., Canadas E., & Bachmann M. (2015). Studying social interactions through immersive virtual environment technology: Virtues, pitfalls, and future challenges. *Frontiers in Psychology*, 6, 869.
- Braun S., & Peus C. (2018). Crossover of work-life balance perceptions: Does authentic leadership matter? *Journal of Business Ethics*, 149(4), 875–893.
- Braun S., Peus C., & Frey D. (2018). Connectionism in action: Exploring the links between leader prototypes, leader gender, and perceptions of authentic leadership. *Organizational Behavior and Human Decision Processes*, 149, 129–144.
- Buso I. M., Di Cagno D., Ferrari L., Larocca V., Lorè L., Marazzi F., ... Spadoni L. (2021). Lab-like findings from online experiments. *Journal of the Economic Science Association*, 7(2), 184–193.
- Cianci A. M., Hannah S. T., Roberts R. P., & Tsakumis G. T. (2014). The effects of authentic leadership on followers' ethical decision-making in the face of temptation: An experimental study. *Leadership Quarterly*, 25(3), 581–594.
- Deci E. L., & Ryan R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227–268.
- DeRue D. S., & Ashford S. J. (2010). Who will lead and who will follow? A social process of leadership identity construction in organizations. *Academy of Management Review*, 35(4), 627–647.
- Eden D. (2017). Field experiments in organizations. *Annual Review of Organizational Psychology and Organizational Behavior*, 4(4), 91–122.

- Eden D. (2021). The science of leadership: A journey from survey research to field experimentation. *Leadership Quarterly*, 32(3), 101472.
- Eden D., Stone-Romero E. F., & Rothstein H. R. (2015). Synthesizing results of multiple randomized experiments to establish causality in mediation testing. *Human Resource Management Review*, 25(4), 342–351.
- The EndNote Team. (2013). *EndNote*. In Clarivate.
- Fischer T., Dietz J., & Antonakis J. (2016). Leadership process models: A review and synthesis. *Journal of Management*, 43(6), 1726–1753.
- Fischer T., Dietz J., & Antonakis J. (2024). A fatal flaw: Positive leadership style research creates causal illusions. *Leadership Quarterly*, 35(3), 101771.
- Fultz D. (2017). *Ten steps for genuine leadership in schools*. UK: Routledge.
- Gardner W. L., Avolio B. J., Luthans F., May D. R., & Walumbwa F. (2005). “Can you see the real me?” A self-based model of authentic leader and follower development. *Leadership Quarterly*, 16(3), 343–372.
- Gardner W. L., Cogliser C. C., Davis K. M., & Dickens M. P. (2011). Authentic leadership: A review of the literature and research agenda. *Leadership Quarterly*, 22(6), 1120–1145.
- Gardner W. L., Karam E. P., Alvesson M., & Einola K. (2021). Authentic leadership theory: The case for and against. *Leadership Quarterly*, 32(6), 101495.
- Gardner W. L., Lowe K. B., Meuser J. D., Noghani F., Gullifor D. P., & Cogliser C. C. (2020). The leadership trilogy: A review of the third decade of The Leadership Quarterly. *Leadership Quarterly*, 31(1), 101379.
- Gardner W. L., & McCauley K. D. (2022). The gaslighting of authentic leadership revisited. *Leadership*, 18(6), 832–840.
- Grant M. J., & Booth A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal*, 26(2), 91–108.
- Haas K., Braun S., & Frey D. (2016). Authentic leadership in the face of organizational change: Evidence from two experimental studies. *Academy of Management Annual Meeting Proceedings*, 2016(1), 1–1.
- Harrison G. W., Haruvy E., & Rutström E. E. (2011). Remarks on virtual world and virtual reality experiments. *Southern Economic Journal*, 78(1), 87–94.
- Harrison J. S., Banks G. C., Pollack J. M., O’Boyle E. H., & Short J. (2017). Publication bias in strategic management research. *Journal of Management*, 43(2), 400–425.
- Ilies R., Morgeson F. P., & Nahrgang J. D. (2005). Authentic leadership and eudaemonic well-being: Understanding leader-follower outcomes. *Leadership Quarterly*, 16(3), 373–394.
- Imai K., Tingley D., & Yamamoto T. (2013). Experimental designs for identifying causal mechanisms. *Journal of the Royal Statistical Society Series A: Statistics in Society*, 176(1), 5–51.
- Innocenti A. (2017). Virtual reality experiments in economics. *Journal of Behavioral and Experimental Economics*, 69, 71–77.
- Iszatt-White M., & Kempster S. (2019). Authentic leadership: Getting back to the roots of the ‘root construct’? *International Journal of Management Reviews*, 21(3), 356–369.
- Johnson H. H., Bluhm D., Hannah S., Avolio B., & Lester P. (2023). Authentic leadership’s impact on follower psychological capital and performance through organizational identification and role clarity. *Human Performance*, 36(5), 219–248.
- Lagowska U., Sobral F., Jacob J., Hafenbrack A. C., & Goldszmidt R. (2024). Following community norms or an internal compass? The role of prospective leaders’ social category membership in the differential effects of authentic and ethical leadership on stereotype threat. *Journal of Applied Psychology*, 109(5), 622–649.
- Leavy P. (2017). *Research design: Quantitative, qualitative, mixed methods, arts-based, and community-based participatory approaches*. New York, NY: Guildford Press.
- Lonati S., Quiroga B. F., Zehnder C., & Antonakis J. (2018). On doing relevant and rigorous experiments: Review and recommendations. *Journal of Operations Management*, 64, 19–40.
- Malloy E., Kavussanu M., & Mackman T. (2023). The effects of authentic leadership on athlete outcomes: An experimental study. *Sport, Exercise, and Performance Psychology*, 12(1), 29–42.
- Manago B., Mize T. D., & Doan L. (2021). Can you really study an army on the internet? Comparing how status tasks perform in the laboratory and online settings. *Sociological Methodology*, 51(2), 319–347.
- McKee V. (2015). An examination of the similarities and differences between transformational and authentic leadership and their relationship to followers’ outcomes. *Dissertation Abstracts International Section A: Humanities and Social Sciences*, 76(1–A(E)).
- Mize T. D., & Manago B. (2022). The past, present, and future of experimental methods in the social sciences. *Social Science Research*, 108, 102799.
- Mol J. M. (2019). Goggles in the lab: Economic experiments in immersive virtual environments. *Journal of Behavioral and Experimental Economics*, 79, 155–164.
- Monzani L., Ripoll P., & Peiró J. M. (2014). Followers’ agreeableness and extraversion and their loyalty towards authentic leadership. *Psicothema*, 26(1), 69–75.

- Monzani L., Ripoll P., & Peiró J. M. (2015). The moderator role of followers' personality traits in the relations between leadership styles, two types of task performance and work result satisfaction. *European Journal of Work & Organizational Psychology*, 24(3), 444–461.
- Munn Z., Peters M. D. J., Stern C., Tufanaru C., McArthur A., & Aromataris E. (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medical Research Methodology*, 18(1), 1–7.
- Munn Z., Pollock D., Khalil H., Alexander L., McLnerney P., Godfrey C. M., ... Tricco A. C. (2022). What are scoping reviews? Providing a formal definition of scoping reviews as a type of evidence synthesis. *JBIM Evidence Synthesis*, 20(4), 950–952.
- Neider L. L., & Schriesheim C. A. (2011). The Authentic Leadership Inventory (ALI): Development and empirical tests. *Leadership Quarterly*, 22(6), 1146–1164.
- Newman A., Bavik Y. L., Mount M., & Shao B. (2021). Data collection via online platforms: Challenges and recommendations for future research. *Applied Psychology*, 70(3), 1380–1402.
- Pan X., & Hamilton A. F. D. C. (2018). Why and how to use virtual reality to study human social interaction: The challenges of exploring a new research landscape. *British Journal of Psychology*, 109(3), 395–417.
- Parigi P., Santana J. J., & Cook K. S. (2017). Online field experiments: Studying social interactions in context. *Social Psychology Quarterly*, 80(1), 1–19.
- Parsons T. D. (2015). Virtual reality for enhanced ecological validity and experimental control in the clinical, affective and social neurosciences [Review]. *Frontiers in Human Neuroscience*, 9, 660.
- Patterson Z., Darbani J., Zacharias A., & Yazdizadeh A. (2017). Comparing text-only and virtual reality discrete choice experiments of neighbourhood choice [Article]. *Landscape and Urban Planning*, 157, 63–74.
- Peters M. D. J., Godfrey C., McLnerney P., Munn Z., Tricco A. C., & Khalil H. (2020 version). Chapter 11: Scoping reviews. In E. Aromataris, and Z. Munn (Eds.), *JBIM Manual for Evidence Synthesis*. Joanna Briggs Institute.
- Peus C., Wesche J. S., Streicher B., Braun S., & Frey D. (2012). Authentic leadership: An empirical test of its antecedents, consequences, and mediating mechanisms. *Journal of Business Ethics*, 107(3), 331–348.
- Pirlott A. G., & MacKinnon D. P. (2016). Design approaches to experimental mediation. *Journal of Experimental Social Psychology*, 66, 29–38.
- Podsakoff P. M., & Podsakoff N. P. (2019). Experimental designs in management and leadership research: Strengths, limitations, and recommendations for improving publishability. *Leadership Quarterly*, 30(1), 11–33.
- Prissé B., & Jorrot D. (2022). Lab vs online experiments: No differences. *Journal of Behavioral and Experimental Economics*, 100, 101910.
- Puni A., & Hilton S. K. (2020). Dimensions of authentic leadership and patient care quality. *Leadership in Health Services*, 33(4), 365–383.
- Randolph-Seng B., & Gardner W. L. (2013). Validating measures of leader authenticity: Relationships between implicit/explicit self-esteem, situational cues, and leader authenticity. *Journal of Leadership & Organizational Studies*, 20(2), 214–231.
- Reips U.-D. (2000). The web experiment method: Advantages, disadvantages, and solutions. In M. H. Birnbaum (Ed.), *Psychological experiments on the internet* (pp. 89–117). San Diego, CA: Academic Press.
- Rietzschel E. F., Wisse B., & Rus D. (2017). Puppet masters in the lab: Experimental methods in leadership research. In B. Schyns, R. J. Hall & P. Neves (Eds.), *Handbook of methods in leadership research* (pp. 48–72). Northampton, MA: Edward Elgar Publishing.
- Rogers J., & Révész A. (2019). Experimental and quasi-experimental designs. In J. McKinley, and H. Rose (Eds.), *The Routledge handbook of research methods in applied linguistics* (pp. 133–143). Oxon: Routledge.
- Rosenberg R. S., Baughman S. L., & Bailenson J. N. (2013). Virtual superheroes: Using superpowers in virtual reality to encourage prosocial behavior. *PloS One*, 8(1), e55003.
- Sajons G. B. (2020). Estimating the causal effect of measured endogenous variables: A tutorial on experimentally randomized instrumental variables. *Leadership Quarterly*, 31(5), 101348.
- Scandura T. A., & Williams E. A. (2000). Research methodology in management: Current practices, trends, and implications for future research. *Academy of Management Journal*, 43(6), 1248–1264.
- Schowalter A. F., & Volmer J. (2023). Are the effects of servant leadership only spurious? The state of research on the causal effects of servant leadership, recommendations, and an illustrative experiment. *Leadership Quarterly*, 34(6), 1–22.
- Shadish W. R., Cook T. D., & Campbell D. T. (2002). *Experiments and generalized causal inference*. USA: Houghton Mifflin.
- Sidani Y. M., & Rowe W. G. (2018). A reconceptualization of authentic leadership: Leader legitimization via follower-centered assessment of the moral dimension. *Leadership Quarterly*, 29(6), 623–636.
- Soderberg A. T., & Romney A. C. (2022). Building trust: How leaders can engender feelings of trust among followers. *Business Horizons*, 65(2), 173–182.
- Spencer S. J., Zanna M. P., & Fong G. T. (2005). Establishing a causal chain: Why experiments are often more effective than mediational analyses in examining psychological processes. *Journal of Personality and Social Psychology*, 89(6), 845–851.
- Stone-Romero E. F., & Rosopa P. J. (2010). Research design options for testing mediation models and their implications for facets of validity. *Journal of Managerial Psychology*, 25(7), 697–712.
- Tricco A. C., Lillie E., Zarin W., O'Brien K. K., Colquhoun H., Levac D., ... Straus S. E. (2018). PRISMA extension for Scoping Reviews (PRISMA-ScR): Checklist and explanation. *Annals of Internal Medicine*, 169(7), 467–473.

- Trilling L. (2009). *Sincerity and authenticity*. US: Harvard University Press.
- Walumbwa F. O., Avolio B. J., Gardner W. L., Wernsing T. S., & Peterson S. J. (2007). Authentic leadership: Development and validation of a theory-based measure†. *Journal of Management*, 34(1), 89–126.
- WHO (World Health Organization) (2022). *Ageing and health*. WHO (World Health Organization). Retrieved October 22 from <https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>
- Wulff J. N., Sajons G. B., Pogrebná G., Lonati S., Bastardo N., Banks G. C., & Antonakis J. (2023). Common methodological mistakes. *Leadership Quarterly*, 34(1), 1–24.
- Zhu Y., Long L., Liu W., Shu P., & Chen S. (2023). How and when does authentic leadership reduce employee resistance to change? An explanation from uncertainty management theory. *Leadership & Organization Development Journal*, 44(8), 969–993.

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