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Knowledge Hiding in Organizations: Meta-Analysis 10 Years Later

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ORIGINAL ARTICLE

Knowledge Hiding in Organizations: Meta-Analysis 10 Years Later

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Abstract

A decade since the seminal paper on knowledge hiding in organizations (Connelly et al., 2012) emerged, this research area has witnessed rapid evolution, resulting in a fragmentation of the field and conceptual proliferation. Given the increasing interest in knowledge hiding, this study complements a set of recently published (systematic) literature reviews and proposes an organizing framework (nomological network) for antecedents and consequences of knowledge hiding, and tests it using meta-analytic procedures. Based on an effect analysis drawn from 131 studies and 147 samples, comprising 47,348 participants, the relationships between knowledge hiding and different antecedent and consequence categories are examined. The results generally support expected relationships across the vast majority of categories of knowledge-hiding antecedents, including job characteristics, leadership, attitudes and motivations, working context, personality, and individual differences. Knowledge hiding is related to outcomes, including creativity, task performance, incivility, deviance, and deterioration of workplace behavior. We also provide comprehensive empirical evidence to support the conceptual claim that knowledge hiding is not correlated with knowledge sharing. We have also tested mediations of the most salient antecedents of knowledge hiding. Through our meta-analytic review, we hope to solidify and redirect the trajectory of the growing and maturing knowledge-hiding domain after its first decade of existence.

Keywords: Knowledge hiding, Knowledge management, Meta-analysis, Nomological network, Mediation

JEL classification: M10, M12

Introduction

Knowledge hiding—“an intentional attempt by an individual to withhold or conceal knowledge that has been requested by another person” (Connelly et al., 2012, p. 65)—is a serious matter in organizations, leading to conflict, deteriorated quality of relations, decreased creativity and task performance. Similar to many counter-productive phenomena, it is a low-frequency, high-impact behavior with empirically documented detrimental effects on important outcomes (see review studies Anand et al., 2020, 2021; Di Vaio et al., 2021; He et al., 2021; Irum et al., 2020; Issac et al., 2021; Oliveira et al., 2021; Rezwani & Takahashi, 2021; Ruparel & Choubisa, 2020; Siachou

et al., 2021; Strik et al., 2021; Xiao & Cooke, 2019). Antecedents to knowledge hiding have been studied even more and include ethical leadership, abusive supervision, distrust, job insecurity, and Machiavellianism, to name just a few. By adding “bells and whistles,” there is an evident risk of conceptual proliferation. Therefore, it is important to take a more objective, meta-analytical stock of both antecedents and consequences of knowledge hiding, above and beyond single-context studies.

In the period between 2012, when the seminal paper was published (Connelly et al., 2012), and late 2022, the knowledge-hiding field witnessed a rapid growth in publications and their impact (Fig. 1). After a decade of development, it is time to pause and make

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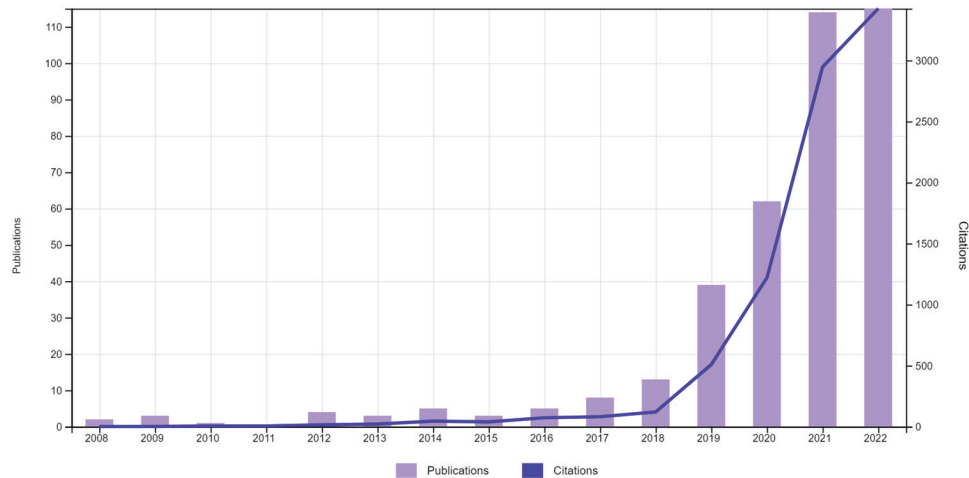


Fig. 1. Growth curve of number of publications on knowledge hiding and their citations. Note: This figure has been created based on search results as of 15 November 2022.

sense of what we know about the knowledge-hiding field. We aim to complement existing literature reviews (Anand et al., 2020; He et al., 2021; Irum et al., 2020; Strik et al., 2021; Xiao & Cooke, 2019; see a detailed comparative analysis in Appendix, Table A1) with meta-analytic techniques in order to further solidify, integrate, and even redirect the field. We intend to do so by providing a quantitative exploration of the nomological network of knowledge hiding in organizations. Our focus is therefore on summarizing empirical evidence by analyzing the direction and strength of effects and relationships with antecedents and consequences in the knowledge-hiding nomological network (cf. Donthu et al., 2021; Zupic & Čater, 2014). This will provide an evidence-driven foundation for the integration and advancing of the field of knowledge hiding in the decades to come.

In domains that have “exploded” over a relatively short period of time, it is very difficult to rely solely on qualitative review studies and bibliometric review (Zupic & Čater, 2014) to advance the existing theory. A meta-analytical approach is a valued contribution to summarize empirical evidence of the relationships among constructs within the knowledge-hiding nomological network and integrate, solidify, and extend the prevalent theory, especially in the case of mixed findings.

Through our meta-analytic review, we intend to make three key theoretical contributions. First, our review shows that the topic of knowledge hiding has developed into several fragmented areas of research. A variety of different constructs stemming from different theoretical backgrounds have been investigated in relation to knowledge hiding. There does not seem to be a very strong consensus regarding what is more or less important to be studied in relation to

knowledge hiding. An important reason for conceptual proliferation is likely the multi-theoretical and even atheoretical basis upon which the knowledge-hiding field has developed so far. This can make it difficult for researchers to see and comprehend the entire conceptual landscape and fully understand the true nature of relationships investigated in this research area (Griffin & Lopez, 2005). On the other hand, many constructs and potentially interesting phenomena that are conceptually proximal to the essence of the knowledge-hiding concept (e.g., employee silence, counterproductive work behavior, knowledge sabotage) have been barely touched upon. Therefore, it is important to examine and meta-analytically evaluate specific elements of the nomological networks to help advance the field and provide a direction for its future development.

Second, and on a related note, we intend to advance the current state-of-the-art in the field by exploring and meta-analytically testing specific relationships, addressing some of the ambiguities that exist in relation to those links. Specifically, we have used the input–mediator–outcome (IMO) model developed from the input–process–outcome model by Ilgen et al. (2005) to propose hypotheses about antecedents (broadly categorized into the above-mentioned five categories), a correlate (knowledge sharing), or outcomes of knowledge hiding. Such a model clearly shows how input and antecedent factors enable or constrain knowledge hiding. Outcomes are results and by-products of the knowledge-hiding process that are valued or not by the individual, team, or organization. Finally, we also delve deeper into potential indirect effects and link antecedents, knowledge hiding, and outcomes, a perspective that has been severely understudied in the extant

knowledge-hiding research, and pose an exploratory research question related to the indirect effect of the phenomenon in focus.

Third, our integrative meta-analytic overview is also intended to address issues of construct validity in the field. There is a great imbalance between the knowledge-hiding field and the much more developed research area of knowledge sharing. This imbalance can be a cause of confusion among readers, reviewers, and occasionally even authors. Conceptually, knowledge hiding (being intentional and occurring as a response to a specific request; Connelly et al., 2012) does not equal a lack of knowledge sharing. Nevertheless, reviewers would, quite often, address this particular theme and wonder whether antecedents and outcomes of knowledge hiding and sharing might be similar. A meta-analytical review that summarizes the nomological network and demonstrates the magnitude of meta-analytic correlations between knowledge hiding and its correlates (data-driven quantitative literature review) is thus needed, in combination with a comprehensive theoretical overview. Admittedly, some of these contributions have been partially addressed with a meta-analysis published exactly at the time of submitting this paper (Arain et al., 2022). Our meta-analysis adds value as it builds upon broader samples (47,348 vs. 31,822 participants, 131 instead of 104 studies); we also examine several mediating models between the most salient knowledge-hiding antecedents and a

set of relevant outcomes, and semantically examine future research directions.

1 Literature review and hypotheses development

1.1 An integrative model of knowledge hiding in organizations

We have constructed our model based on previous authors' suggestions (Connelly et al., 2019) and review studies (He et al., 2021; Siachou et al., 2021), which delineate a possible list of antecedents and outcomes of knowledge hiding. Variables (antecedents, a correlate, and outcomes) in our list are chosen based on two particular reasons; a theoretical one, founded in the aforementioned IMO model and the five-dimensional categorization we developed on its basis, and a practical/empirical one, with the variables within the categories being selected based on the empirical research already conducted in the knowledge-hiding field and the most studied variables.

Fig. 2 represents the overall examined model.

1.2 Hypotheses related to the antecedents of knowledge hiding

1.2.1 Job characteristics

The first set of factors that have been studied in association with knowledge hiding is related to job

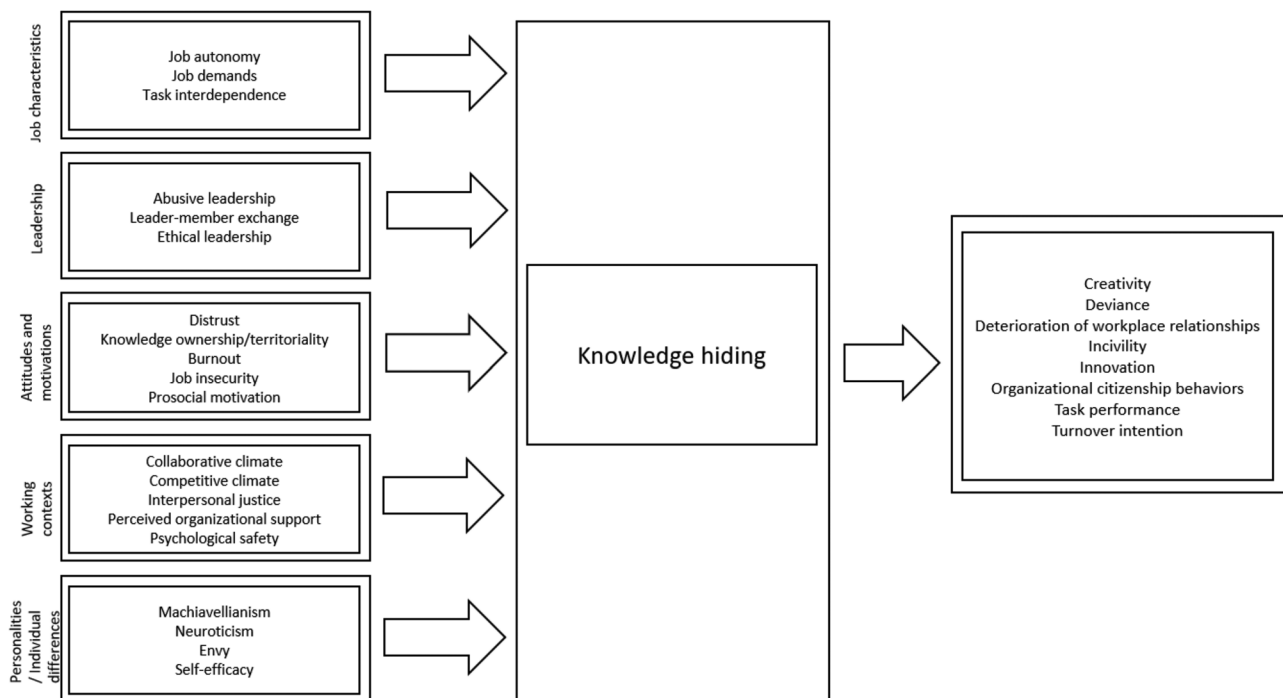


Fig. 2. Nomological network of knowledge hiding.

characteristics. Their foundations lie in motivational job design and the job characteristics model (Hackman & Oldham, 1975; Morgeson & Humphrey, 2006). Specifically, the job characteristics that have been studied the most extensively refer to one's social boundaries stemming from the structure and nature of work and can be seen as polar opposites, i.e., job autonomy and task interdependence. Autonomy refers to one's freedom in performing work and to both task and work scheduling discretion (Breugh, 1985). Task interdependence, on the other hand, reflects the connectedness of employees' tasks to achieve a common outcome (Hertel et al., 2004).

While both have been used in knowledge-hiding research mostly as boundary conditions to other effects (Černe et al., 2017; Fong et al., 2018), we can conceptualize their direct linkage with knowledge hiding as well (Su, 2021). *Job autonomy* potentially makes it easier to establish territoriality over knowledge and conduct work "in secrecy" due to the inherent independence it entails, and easier to invent reasons for hiding, such as playing dumb, or for rationalizing hiding. On the other hand, *task interdependence*, initiated, received, and reciprocal, reflects the need to be related to and interconnected with colleagues in the working process, potentially preventing knowledge-hiding decisions as they would not be mutually beneficial for achieving common goals (Butt et al., 2020; Staples & Webster, 2008).

Job demands is an umbrella term for either positive or negative impositions stemming from one's job. Research on the matter mostly applies the job demands–resources model (Bakker & Demerouti, 2007), an occupational stress model that suggests strain is a response to an imbalance between demands on the individual and the resources the individual has to deal with those demands. Knowledge-hiding research has established that high levels of some demands (e.g., time pressure, work overload) make individuals conserve their resources (e.g., knowledge as a competitive advantage over colleagues, which might be particularly true in competitive environments) and thereby hide knowledge more frequently (Gagné et al., 2019; Škerlavaj et al., 2018; Sofyan et al., 2021). We therefore propose:

H1. *Autonomy and job demands are positively related to knowledge hiding, whereas task interdependence is negatively related to knowledge hiding.*

1.2.2 Leadership

In recent years, high quality leader–follower relations have been identified alongside collegiate relations as a potential way of preventing knowledge hiding at work. Mechanisms through which leaders

influence their employees' knowledge-hiding decisions relate to role modeling (especially in the case of *ethical leadership* (Abdullah et al., 2019; Men et al., 2020)) or positive reciprocity (in particular in the case of *leader–member exchange; LMX* (Babič et al., 2019; Zhao et al., 2019)). Indeed, supervisors influence the establishment of psychological safety and high-quality relationships among team members, who tend to reciprocate fair treatment and role model positive relationships with their leaders with their colleagues as well.

This logic also works the other way around, as shown by research linking "negative" leadership styles, such as *abusive leadership*, with knowledge hiding. Abusive supervision tends to lead to perceptions of injustice, unequal treatment, and distrust (Agarwal et al., 2021; Farooq & Sultana, 2021), making employees hide more knowledge (Offergelt & Venz, 2022). Therefore:

H2. *Abusive leadership is positively related to knowledge hiding, whereas leader–member exchange and ethical leadership are negatively related to knowledge hiding.*

1.2.3 Attitudes and motivations

The next section of knowledge-hiding antecedents refers to "positive" or "negative" attitudes related to the work environment, one's position and relationships at work. *Distrust* and *knowledge territoriality* have been established as being among the strongest predictors of knowledge hiding, as they directly reflect characteristics of poor working relationships and knowledge exchanges. When individuals distrust another colleague, they are more likely to not want to help them get the information they need (Connelly et al., 2012; Kumar Jha & Varkkey, 2018), and when an individual perceives they hold ground on a particular knowledge domain, they tend not to let others in to potentially steal their competitive advantage related to this knowledge (Guo et al., 2022; Singh, 2019).

A similar logic applies to the case of *job insecurity*, which might also drive knowledge-hiding behavior for the same reasons of attempting to improve one's chances of staying in an organization (not losing one's position) and thriving in the eyes of others. *Burnout*, on the other hand, reflects an individual's emotional exhaustion in the long run, produced by excessive stress, pressure, demands, or overload. When feeling burned out, individuals tend to resort to knowledge hiding simply because of a lack of time and to conserve resources that are already emotionally depleted (Zhao & Jiang, 2021).

On the other hand, when individuals exhibit motivations to help one another, to care about benefiting others, and protect and promote the well-being of

colleagues (i.e., *prosocial motivation*), they tend to refrain from hiding knowledge from colleagues as they are aware of potentially harming their working relationships or their colleagues' goal attainment (Hernaus & Černe, 2022; Hernaus et al., 2019). Thus:

H3. *Distrust, knowledge territoriality, burnout, and job insecurity are positively related to knowledge hiding, whereas prosocial motivation is negatively related to knowledge hiding.*

1.2.4 Working context

Working context and the perceptions individuals develop regarding their work surroundings have been extensively studied in relation to knowledge hiding, mostly in combination with other, mostly individual-level, variables (e.g., Banagou et al., 2021; El-Kassar et al., 2022; Han et al., 2020). The context has been covered either by multi-level research designs or by focusing on individual-level perceptions (i.e., the micro, psychological climates). In general, competitive environments, such as those characterized by high levels of *competitive* or *performance climate*, which are based on normative comparison, have been demonstrated to stimulate individual competition and thereby hiding knowledge from coworkers in an attempt to improve one's individual position in a work setting, obtain a competitive advantage over colleagues with particular pieces of valuable information or knowledge, or improve individual goal attainment this way (Banagou et al., 2021; Hernaus et al., 2019; Zhu et al., 2019). A *collaborative climate* (including *mastery* or *learning*), on the other hand, emphasizes effort, individual development and team cooperation, and thereby includes mechanisms of self- (as opposed to other-) referencing improvement, mutual support, and common goals, and thus prevents knowledge hiding (Banagou et al., 2021; Bari et al., 2019; Černe et al., 2017).

Perceived organizational support represents another element of a positive working environment that is conducive to knowledge exchange and could prevent knowledge hiding. When individuals feel supported by their immediate or distal actors in their work setting, they develop perceptions of not being punished for voicing their opinion (even if it might go against the common and predominant line of thought). The same is true for *psychological safety* (climate), a personal belief that it is safe to take a risk and express oneself without fear or negative consequences (Edmondson & Lei, 2014; Men et al., 2020; Newman et al., 2017), and *interpersonal justice*, the degree to which people are treated with dignity and respect, based on equal treatment principles (Johnson et al., 2014). In such a working environment,

knowledge and information sharing is encouraged and employees engage in it without fear of being punished for voicing out, or without the need to preserve their knowledge to be put in a superior position in relation to colleagues (Jiang et al., 2019; Men et al., 2020). Thus:

H4. *A collaborative climate, perceived organizational support, interpersonal justice, and psychological safety are positively related to knowledge hiding, whereas a competitive climate is negatively related to knowledge hiding.*

1.2.5 Personality and individual differences

Existing research indicates that some people tend to hide knowledge more often than others, based on their personality traits or individual differences. Some individual traits with negative connotations are particularly suitable for positively predicting knowledge hiding. Specifically, *Machiavellianism*, as one of the dark triad personality dimensions centered on manipulateness, callousness, and indifference to morality (Wilson et al., 1996), may positively predict knowledge hiding since such individuals do not mind resorting to knowledge hiding as a means to achieve their own individual agenda without much consideration for others (Pan et al., 2016, 2018).

Individuals high in *neuroticism*, a fundamental personality trait that is part of the core Big 5 personality dimensions and reflects a trait disposition to experience negative affects, including anger, anxiety, self-consciousness, irritability, and emotional instability (Cattell & Scheier, 1961; Widiger, 2009), would also tend to hide knowledge more. This is because individuals high in neuroticism tend to exhibit poor judgement in collaborative working situations, negatively interpret even neutral stimuli, and are thus more susceptible to hiding knowledge (Anaza & Nowlin, 2017; Arshad & Ismail, 2018).

An individual's perception of *envy* might also be a factor in predicting higher levels of knowledge hiding, as feeling envious towards a colleague might stimulate individuals to attempt to improve their social or organizational status, such as reducing the comparison gap they perceive, by hiding knowledge (Li et al., 2022; Peng et al., 2020). On the other hand, when individuals exhibit high levels of *self-efficacy*, resorting to knowledge hiding to appear competent or perform well at work is not necessary as such individuals already perceive themselves as more than capable of delivering what is expected of them. We therefore propose:

H5. *Machiavellianism, neuroticism, and envy are positively related to knowledge hiding, whereas self-efficacy is negatively related to knowledge hiding.*

1.2.6 Positive outcomes

Knowledge hiding has also been studied in relation to beneficial organizational outcomes that add value to organizational endeavors. High-quality social exchange relationships between coworkers represent a valuable source of *creativity* (idea generation) and *innovation* (idea implementation), as they trigger knowledge-sharing crucially needed for creative problem-solving in the idea identification and verification stage (Bogilović et al., 2017; Fong et al., 2018), but also in the stage where resource acquisition (e.g., support, material sources, help) is needed for novel ideas to be implemented (Černe et al., 2017; Guo et al., 2022).

As previously mentioned, high-quality knowledge exchange relationships with minimum knowledge hiding and conservation of knowledge resources are also characterized by helping and *organizational citizenship behavior* that is aimed at increasing mutual benefits and caring for the well-being of others in a social or organizational setting (Kaur & Kang, 2022). Taken together, through these mechanisms, the well-established reciprocal distrust loop that results in knowledge hidiers “shooting themselves in the foot” by hiding knowledge and thereby getting knowledge that they require for their work hidden in return (Černe et al., 2014), knowledge hiding is also expected to decrease knowledge hidiers’ *task performance*.

H6. *Knowledge hiding is negatively related to creativity, innovation, task performance, and organizational citizenship behaviors.*

1.2.7 Negative outcomes

Frequently (although not exclusively) associated with negative intentions, knowledge hiding has been shown to lead to a plethora of undesirable organizational outcomes. It predicts or is an expression of *incivility* and *deviance*, as knowledge-hiding behavior tends to appear counterproductive and goes against the legitimate interests of the collective (Irum et al., 2020; Singh, 2019). In the same vein, once recognized, it is well established that knowledge hiding results in a *deterioration of workplace relationships*, producing a negative spiral of interpersonal conflict, poor working associations, and negative organizational outcomes (Jafari-Sadeghi et al., 2022; Miminoshvili & Černe, 2022; Venz & Nesher Shoshan, 2022; Xiao & Cooke, 2019).

On another spectrum of negative outcomes, perceived knowledge hiding also leads to a loss of commitment and *turnover intentions* (Offergelt et al., 2019; Zhang & Min, 2022), which also increase once individuals hide knowledge with an intention to quit and thereby stop contributing to the organization

they no longer see themselves attached to in the long run (Jena & Swain, 2021). Thus:

H7. *Knowledge hiding is positively related to incivility, deviance, turnover intention, and deterioration of workplace relationships.*

1.2.8 Key correlates of knowledge hiding

A common critique of knowledge-hiding research is that it builds on established linkages that are well known from the study of *knowledge sharing*. Indeed, many antecedents and consequences might play out in an opposite manner to those of knowledge sharing. However, knowledge hiding is not just the opposite of knowledge sharing, as conceptualized already at the outset of the study of knowledge hiding in organizational settings. Knowledge hiding is not simply the absence of sharing; rather, knowledge hiding is the intentional attempt to withhold or conceal knowledge that has been requested by another individual (Connelly et al., 2012). As further developed by Connelly et al. (2012), behaviorally, the two constructs appear similar but the motivations behind knowledge hiding and a lack of knowledge sharing are patently different. Knowledge hiding might be motivated by a number of different reasons, which are already discussed above, whereas a lack of knowledge sharing is likely only driven by an absence of the knowledge itself (Connelly et al., 2012). We thus propose an empirical meta-analytical test of this assertion:

H8. *Knowledge hiding is not related to (the lack of) knowledge sharing.*

1.2.9 Knowledge hiding as mediator

Knowledge hiding might also hold an important indirect place in understanding knowledge-related behavior in organizations. The processes or mediators represent an important element of the IMO model because they elucidate two matters. On the one hand, they describe how antecedents are related to outcomes, and on the other hand, they also highlight the uniqueness of the mediators or processes (e.g., that knowledge hiding is different from knowledge sharing) (Mathieu et al., 2008). Therefore, we also delve deeper into potential indirect effects and link antecedents, knowledge hiding, and outcomes, by posing an exploratory research question related to the indirect effect of the knowledge hiding: *Does knowledge hiding mediate the relationship between selected antecedents (job characteristics, leadership, attitudes/motivations, working context, and individual differences) and outcomes (performance, organizational citizenship behavior, deviance, creativity)?*

2 Method

2.1 Literature search and criteria for inclusion

To identify relevant studies, we first searched for published and unpublished studies on knowledge hiding using online databases across multiple disciplines including EBSCO Host, Emerald, JSTOR, Oxford Press, ProQuest, Sage Journals, Science Direct, Springer Link, Taylor and Francis, and Web of Science. We used the search term “knowledge hiding” to identify relevant studies. Second, we conducted a forward citation search of the prominent knowledge-hiding scale by [Connolly et al. \(2012\)](#). Third, we searched for in-press articles in leading management journals and conference proceedings, as well as contacted authors for unpublished articles. In our search, we identified all the papers that include knowledge hiding anywhere in the text.

The broad search in March 2022 identified an initial sample of 342 documents. This initial pool included both empirical and theoretical studies, serving as the basis of our review. To provide a quantitative review of knowledge hiding, we additionally screened this initial pool to identify empirical studies that are suitable to be included in a meta-analysis. To be included in the meta-analysis, a study should (a) report the sample size, (b) report correlations (or other effect sizes) between knowledge hiding and its correlates, and (c) involve an adult sample. This additional screening identified 131 studies and 147 samples, comprising 47,348 participants. Two research assistants coded all the studies independently. The average inter-coder percentage of agreement across the study variables was 95%. When there were discrepancies among the raters, two coders and an author discussed the codings until a consensus was reached.

2.2 Meta-analytic procedures

To provide a nomological network of knowledge hiding with magnitudes of effect sizes, we conducted a meta-analysis based on the random-effects approach to psychometric meta-analyses advocated by [Schmidt and Hunter \(2014\)](#). We used the Metafor Package in R to calculate the population correlations between knowledge hiding and its correlates. With psychometric meta-analyses, we corrected for attenuation in observed correlations due to statistical artifacts including sampling error and measurement unreliability in both knowledge hiding and its correlates. For each meta-analysis, we reported the sample size (N), number of effect sizes (k), uncorrected correlation (r), corrected ρ (effect sizes corrected for

reliability in knowledge hiding and its correlates), standard deviation of ρ , heterogeneity of the effect sizes (Q), 80% credibility interval (80% CV), and 95% confidence intervals (95% CI). We applied the same procedures to analyze the population correlations between knowledge hiding and its correlates.

3 Results

[Table 1](#) presents the meta-analytical relationships between knowledge hiding and other studied constructs. [Hypothesis 1](#) predicted that autonomy and job demands are positively related to knowledge hiding, whereas task interdependence is negatively related to knowledge hiding. Results in [Table 1](#) did not support this hypothesis. Overall, job characteristics, including task interdependence ($\rho = .02$, 95% CI = $[-.19, .24]$) and job autonomy ($\rho = .00$, 95% CI = $[-.20, .20]$) are not related to knowledge hiding. Although job demands ($\rho = -.27$, 95% CI = $[-.49, -.04]$) are related to knowledge hiding, the relationship is opposite to our hypothesis.

[Hypothesis 2](#) predicted that abusive leadership is positively related to knowledge hiding, whereas leader-member exchange and ethical leadership are negatively related to knowledge hiding. Results in [Table 1](#) supported this hypothesis. Overall, leadership behaviors, including LMX ($\rho = -.26$, 95% CI = $[-.50, -.03]$) and ethical leadership ($\rho = -.17$, 95% CI = $[-.25, -.09]$) are negatively related to knowledge hiding, whereas abusive supervision ($\rho = .45$, 95% CI = $[.32, .59]$) is positively related to knowledge hiding.

[Hypothesis 3](#) predicted that distrust, knowledge territoriality, burnout, and job insecurity are positively related to knowledge hiding, whereas prosocial motivation is negatively related to knowledge hiding. Results in [Table 1](#) supported this hypothesis that work attitudes and motivations are predictors of knowledge hiding. Specifically, distrust ($\rho = .43$, 95% CI = $[.37, .49]$), knowledge territoriality ($\rho = .24$, 95% CI = $[.10, .39]$), burnout ($\rho = .54$, 95% CI = $[.49, .60]$), and job insecurity ($\rho = .36$, 95% CI = $[.08, .64]$) are positively related to knowledge hiding, whereas prosocial motivation ($\rho = -.19$, 95% CI = $[-.27, -.11]$) is negatively related to knowledge hiding.

[Hypothesis 4](#) predicted that a collaborative climate, perceived organizational support, interpersonal justice, and psychological safety are positively related to knowledge hiding, whereas a competitive climate is negatively related to knowledge hiding. Results partially supported [Hypothesis 4](#). Specifically, a collaborative climate ($\rho = -.14$, 95% CI = $[-.27, -.01]$), interpersonal justice ($\rho = -.39$, 95% CI = $[-.61, -.18]$), and psychological safety ($\rho = -.47$, 95% CI = $[-.61, -.32]$) are negatively associated with

Table 1. Meta-analysis of the antecedents and consequences of knowledge hiding.

Variable	K	N	r	ρ	SD ρ	Q	80% CV		95% CI		Fsn
							Lower	Upper	Lower	Upper	
Antecedents											
<i>Job characteristics</i>											
Job autonomy	4	1051	.00	.00	.18	33.31*	-.23	.23	-.20	.20	0
Job demands	4	1055	-.24	-.27	.21	46.59*	-.53	.00	-.49	-.04	108
Task interdependence	12	3033	.02	.02	.34	337.80*	-.42	.46	-.19	.24	0
<i>Leadership</i>											
Abusive leadership	9	2607	.41	.45	.19	139.33*	.21	.69	.32	.59	2792
Leader-member exchange	11	4227	-.22	-.26	.18	140.94*	-.39	-.13	-.50	-.03	1111
Ethical leadership	9	3067	-.15	-.17	.10	34.07*	-.29	-.04	-.25	-.09	228
<i>Attitudes and motivations</i>											
Distrust	9	2940	.38	.43	.06	20.32*	.35	.51	.37	.49	1721
Knowledge (psychological) ownership/territoriality	15	4079	.21	.24	.26	273.00*	-.10	.58	.10	.39	1471
Burnout	4	1094	.46	.54	.00	2.04	.54	.54	.49	.60	528
Job insecurity	6	1547	.31	.36	.33	212.95*	-.06	.79	.08	.64	587
Prosocial motivation	5	1284	-.17	-.19	.05	8.36	-.26	-.12	-.27	-.11	67
<i>Working contexts</i>											
Collaborative climate (incl. mastery climate)	8	1674	-.11	-.14	.15	36.47*	-.33	.05	-.27	-.01	74
Perceived organizational support	5	1627	-.10	-.13	.25	88.37*	-.45	.20	-.35	.10	52
Interpersonal justice	3	763	-.37	-.39	.18	34.47*	-.62	-.16	-.61	-.18	203
Psychological safety	7	2385	-.38	-.47	.18	88.14*	-.70	-.24	-.61	-.32	1533
Competitive climate (incl. performance climate)	7	1623	.25	.29	.17	54.36*	.07	.51	.14	.43	305
<i>Personalities and individual differences</i>											
Machiavellianism	6	1823	.32	.37	.03	.20	.34	.41	.31	.43	465
Neuroticism	5	950	.41	.47	.25	81.71*	.14	.79	.23	.70	516
Envy	9	4352	.36	.44	.11	60.54*	.29	.58	.35	.53	2665
Self-efficacy	5	1572	-.06	-.07	.32	135.57*	-.48	.34	-.37	.23	0
Outcomes											
Creativity	12	3516	-.26	-.30	.30	379.82*	-.68	.11	-.50	-.07	1059
Innovation	7	2479	-.08	-.09	.24	128.01*	-.39	.22	-.29	.11	22
Task performance	10	2519	-.21	-.23	.22	130.38*	-.51	.05	-.38	-.08	640
Organizational citizenship behavior	13	4352	-.16	-.18	.47	1075.95*	-.78	.42	-.45	.09	618
Incivility	5	1209	.55	.62	.09	23.37*	.50	.74	.53	.72	1546
Deviance	4	1220	.37	.39	.12	23.99*	.26	.53	.24	.54	337
Turnover intention	6	3808	.18	.20	.25	233.08*	-.11	.52	-.04	.45	191
Deterioration of workplace relationships	5	1200	.25	.30	.05	7.40	.24	.37	.23	.38	157
Correlate											
Knowledge sharing	14	3376	-.05	-.06	.40	491.89*	-.57	.44	-.30	.17	299

Note: N = combined sample size; K = number of samples; r = mean uncorrected correlation; ρ = estimated true score correlation corrected for measurement error; Q = Q statistic (Hedges & Olkin, 1984); CV = credibility interval; CI = confidence interval; Fsn = fail-safe N.

* $p < .05$.

knowledge hiding, whereas a competitive climate is positively associated with knowledge hiding ($\rho = .29$, 95% CI = [.14, .43]). However, our results indicated that perceived organizational support is not associated with knowledge hiding ($\rho = -.13$, 95% CI = [-.35, .10]).

Hypothesis 5 predicted that Machiavellianism, neuroticism, and envy are positively related to knowledge hiding, whereas self-efficacy is negatively related to knowledge hiding. Results partially supported **Hypothesis 5**. Specifically, Machiavellianism ($\rho = .37$, 95% CI = [.31, .43]), neuroticism ($\rho = .47$, 95% CI = [.23, .70]), and envy ($\rho = .44$, 95% CI = [.35,

.53]) are positively associated with knowledge hiding. However, our results indicated that self-efficacy is not associated with knowledge hiding ($\rho = -.07$, 95% CI = [-.37, .23]).

Hypothesis 6 predicted that knowledge hiding is negatively related to creativity, innovation, task performance, and organizational citizenship behavior. Results partially supported **Hypothesis 6**. Specifically, knowledge hiding is negatively associated with creativity ($\rho = -.30$, 95% CI = [-.50, -.07]) and task performance ($\rho = -.23$, 95% CI = [-.38, -.08]). However, our results indicated that knowledge hiding is not associated with innovation ($\rho = -.09$, 95%

CI = [−.29, .11]) or organizational citizenship behavior ($\rho = -.18$, 95% CI = [−.45, .09]).

Hypothesis 7 predicted that knowledge hiding is positively related to incivility, deviance, turnover intention, and deterioration of workplace relationships. Results partially supported **Hypothesis 7**. Specifically, knowledge hiding is positively associated with incivility ($\rho = .62$, 95% CI = [.53, .72]), deviance ($\rho = .39$, 95% CI = [.24, .54]), and deterioration of workplace relationships ($\rho = .30$, 95% CI = [.23, .38]). However, our results indicated that knowledge hiding is not associated with turnover intention ($\rho = .20$, 95% CI = [−.04, .45]) or organizational citizenship behavior ($\rho = -.18$, 95% CI = [−.45, .09]).

Hypothesis 8 predicted that knowledge hiding is not the opposite of knowledge sharing. Results supported **Hypothesis 8**, indicating that knowledge hiding is not associated with knowledge sharing ($\rho = -.06$, 95% CI = [−.30, .17]).

3.1 Supplementary mediation analysis

In addition to testing knowledge hiding as an antecedent or outcome of specific factors that were conceptualized and hypothesized in advance, we also conducted post-hoc supplementary analyses that test each factor's role as a mediator that could explain the impact of its antecedents on its outcomes following the logic of the IMO framework. Testing the mediation relationships requires using the meta-analytical structural equation modeling technique with the correlation matrix as the data input (Viswesvaran & Ones, 1995). Because different antecedents are associated with different theoretical perspectives, we tested mediation effects with only one antecedent at a time. We used two criteria for the choice of constructs that were proposed as antecedents in such mediation models: 1) that an antecedent exhibited a statistically significant relationship with knowledge hiding in the

direct effect meta-analysis; and 2) that an antecedent appeared in at least four studies of knowledge hiding.

In each model, we included commonly examined behavioral outcomes, including task performance, organizational citizenship behavior, deviance, and creativity. To construct the required correlation matrix as presented in Table 2, we first searched for correlations from published studies. For those that we could not find in the literature, we searched primary studies and conducted a meta-analysis ourselves.

In the mediation analysis, we started with saturated models because we did not hypothesize that knowledge hiding fully mediates the relationships between the antecedent and behavioral outcomes. Instead, we believe that there are other theoretical mediators that also explain the relationships between the corresponding antecedent and behavioral outcomes (e.g., between autonomy and task performance; see for example, Langfred & Moye, 2004). Therefore, in all these mediation models, we kept the direct effects of the antecedent and outcomes. Knowledge hiding was treated as a partial mediator in these models. We present the mediation models in Figs. 3–7 and the associated indirect effects in Table 3.

Overall, knowledge hiding is a mediator for most of the relationships. Specifically, knowledge hiding is a mediator between job insecurity on the one hand and task performance (indirect effect = $-.07$, $p < .000$), organizational citizenship behavior (indirect effect = $-.06$, $p < .000$), deviance (indirect effect = $.14$, $p < .000$), and creativity (indirect effect = $-.11$, $p < .000$) on the other. Knowledge hiding is a mediator between psychological safety on the one hand and deviance (indirect effect = $-.13$, $p < .000$) and creativity (indirect effect = $.14$, $p < .000$), but not task performance (indirect effect = $.02$, $p > .05$) or organizational citizenship behavior (indirect effect = $.02$, $p > .05$), on the other. Knowledge hiding is a mediator between abusive supervision on the one hand and

Table 2. Correlation matrix for mediation analysis.

	Job insecurity	Abusive leadership	Distrust	Psychological safety	Neuroticism	Creativity	Task performance	Organizational citizenship behavior
Creativity	−.10 (10, 5964) ¹	−.13 (5, 1863) ¹²	−.59 (5, 1542) ¹²	.13 (10, 4567) ⁵	−.08 (18, 7661) ⁷			
Task performance	−.17 (53, 21,461) ¹	−.19 (16, 4012) ²	−.30 (53, 12,237) ⁶	.43 (18, 4061) ⁵	−.19 (20, 4106) ⁸	.55 (28, 7660) ¹⁰		
Org. citizenship	−.09 (5, 1436) ¹²	−.24 (6, 1319) ³	.34 (39, 10,615) ⁶	.32 (16, 7275) ⁵	−.15 (36, 8629) ⁹	.56 (19, 4352) ¹⁰	.29 (38, 3097) ¹¹	
Deviance	.14 (19, 7219) ¹	.42 (29, 9447) ⁴	.41 (5, 1892) ¹²	−.39 (4, 1064) ¹²	.18 (28, 8474) ⁴	−.04 (3, 2315) ¹²	−.32 (18, 3406) ⁴	−.22 (43, 11,342) ⁴

Note: In each cell, next to the main correlation, we report the corrected correlation (ρ) outside the parentheses, and the number of studies (k) and number of participants (N) within the parentheses.

¹Sverke et al., 2019; ²Mackey et al., 2017; ³Zhang & Liao, 2015; ⁴Mackey et al., 2021; ⁵Frazier et al., 2017; ⁶Legood et al., 2021; ⁷Zare & Flinchbaugh, 2019; ⁸Judge & Bono, 2001; ⁹Chiaburu et al., 2011; ¹⁰Harari et al., 2016; ¹¹Nielsen et al., 2009; ¹²from our own meta-analysis.

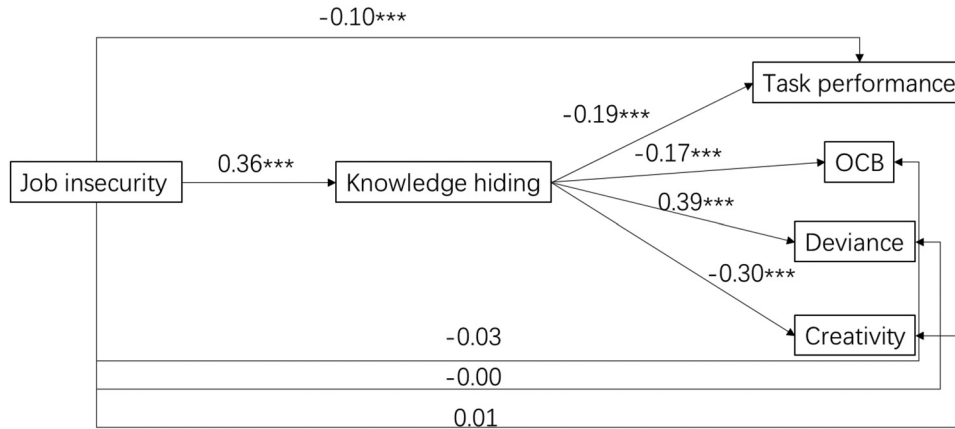


Fig. 3. Mediation model with job insecurity as an antecedent. Note: $N = 3047$. *** $p < .001$.

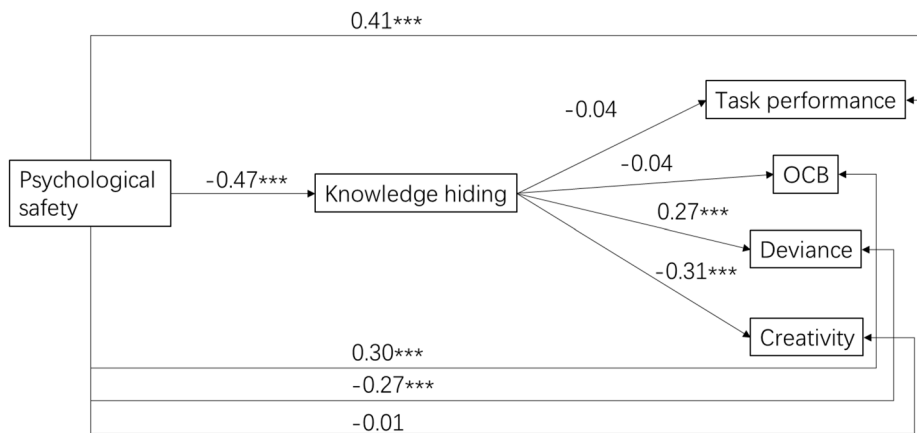


Fig. 4. Mediation model with psychological safety as an antecedent. Note: $N = 2890$. *** $p < .001$.

task performance (indirect effect = $-.08$, $p < .000$), organizational citizenship behavior (indirect effect = $-.04$, $p < .000$), deviance (indirect effect = $.31$, $p < .000$), and creativity (indirect effect = $-.14$, $p < .000$) on the other. Knowledge hiding is a mediator between neuroticism on the one hand and task performance

(indirect effect = $-.09$, $p < .000$), organizational citizenship behavior (indirect effect = $-.07$, $p < .000$), deviance (indirect effect = $.18$, $p < .000$), and creativity (indirect effect = $-.16$, $p < .000$) on the other. Knowledge hiding is a mediator between distrust on the one hand and task performance (indirect effect = $-.05$,

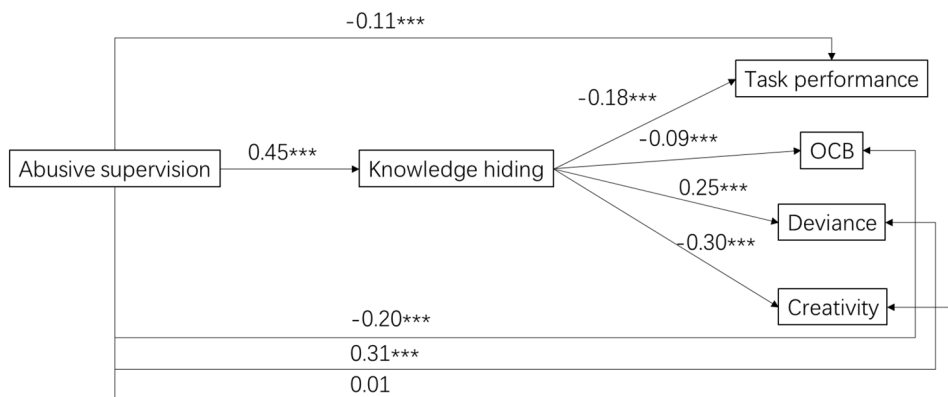


Fig. 5. Mediation model with abusive supervision as an antecedent. Note: $N = 2951$. *** $p < .001$.

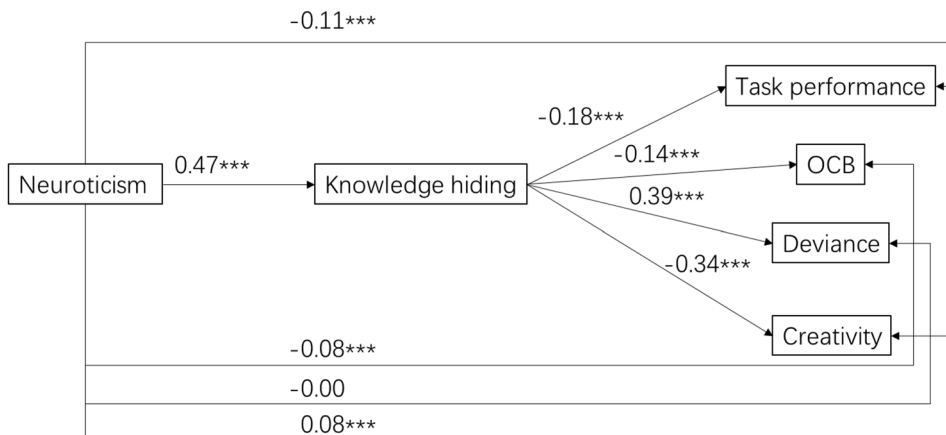


Fig. 6. Mediation model with neuroticism as an antecedent. Note: N = 3068. *** $p < .001$.

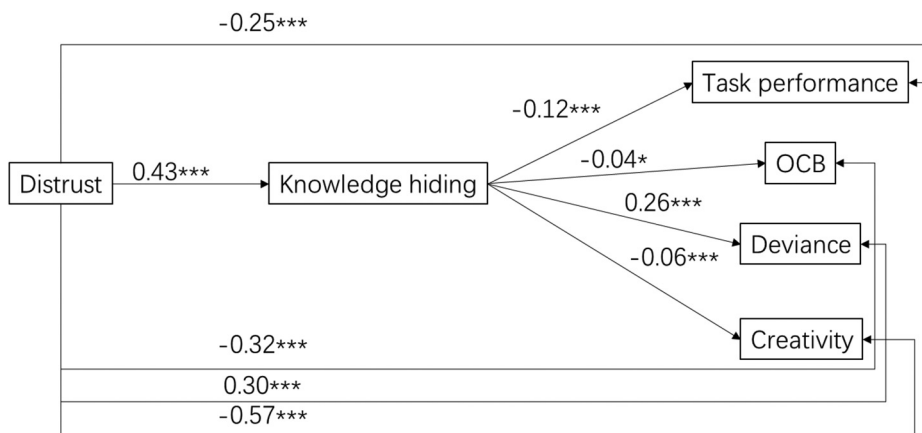


Fig. 7. Mediation model with distrust as an antecedent. Note: N = 3048. *** $p < .001$, * $p < .05$.

$p < .000$), organizational citizenship behavior (indirect effect = $-.02, p < .05$), deviance (indirect effect = $.11, p < .000$), and creativity (indirect effect = $-.02, p < .001$ on the other).

4 Discussion

4.1 Theoretical implications and general discussion

This meta-analytic review takes stock, in quantitative terms, of the nomological network of knowledge-hiding antecedents and outcomes. It is a response to the urgent need for a comprehensive analysis of the decade-long, rapid, and rather divergent development of the knowledge-hiding topic into several fragmented multi- and even atheoretical subdomains. Our intention is to complement a set of recent qualitative literature reviews and one very recent meta-analysis (Arain et al., 2022) in order to jointly integrate, advance, and partially redirect the growing and maturing field of knowledge hiding in organizations. The meta-analytical results generally support

expected relationships across the vast majority of categories of knowledge-hiding antecedents, including job characteristics, leadership, attitudes and motivations, working context, personality, and individual differences. Knowledge hiding is related to outcomes including creativity, task performance, incivility, deviance, and deterioration of workplace behavior. We also provide comprehensive empirical evidence to support the conceptual claim that knowledge hiding is not correlated with knowledge sharing. Furthermore, we have also tested mediations of the most salient antecedents of knowledge hiding within each of the five categories of antecedents.

Our first theoretical contribution that will help carry the knowledge-hiding field forward is related to establishing a nomological network of knowledge hiding (Fig. 2) based on quantitative meta-analytic measures, validating its most important antecedents, correlates, and outcomes. In terms of antecedents, theoretically interesting non-findings are related to the relationship between knowledge hiding and job design variables, and climate. Neither autonomy nor

Table 3. Indirect effects from antecedents to outcomes via knowledge hiding (KH).

	Indirect effects	<i>p</i> values
<i>Model 1</i>		
Job insecurity → KH → Performance	−0.07*	0.000
Job insecurity → KH → Organizational citizenship behavior	−0.06*	0.000
Job insecurity → KH → Deviance	0.14*	0.000
Job insecurity → KH → Creativity	−0.11*	0.000
<i>Model 2</i>		
Psychological safety → KH → Performance	0.02	0.056
Psychological safety → KH → Organizational citizenship behavior	0.02	0.053
Psychological safety → KH → Deviance	−0.13*	0.000
Psychological safety → KH → Creativity	0.14*	0.000
<i>Model 3</i>		
Abusive supervision → KH → Performance	−0.08*	0.000
Abusive supervision → KH → Organizational citizenship behavior	−0.04*	0.000
Abusive supervision → KH → Deviance	0.31*	0.000
Abusive supervision → KH → Creativity	−0.14*	0.000
<i>Model 4</i>		
Neuroticism → KH → Performance	−0.09*	0.000
Neuroticism → KH → Organizational citizenship behavior	−0.07*	0.000
Neuroticism → KH → Deviance	0.18*	0.000
Neuroticism → KH → Creativity	−0.16*	0.000
<i>Model 5</i>		
Distrust → KH → Performance	−0.05*	0.000
Distrust → KH → Organizational citizenship behavior	−0.02*	0.029
Distrust → KH → Deviance	0.11*	0.000
Distrust → KH → Creativity	−0.02*	0.001

Note: * $p < .05$.

task interdependence have exhibited a significant relationship with knowledge hiding across studies. So far it seems that individuals tend to hide knowledge regardless of how their work is structured, indicating that job design is not related to employee decisions to hide knowledge. However, it is also possible that the analyses conducted require more granularity, as there is evidence that relational job design matters for employee prosocial behaviors (Grant & Berry, 2011) and could therefore mitigate motivations to hide knowledge. We encourage future researchers in the domain of knowledge hiding to explore the role of relational design.

Individual characteristics and situational interpersonal dynamics seem more relevant, and should be the focus of subsequent research on the matter. As for organizational climates, they do not seem to have a significant link with knowledge hiding either. In fact, this non-finding is consistent with and corroborates the context theory of organizational behavior (Johns, 2006), or trait activation theory (Tett et al., 2021), which propose climates and other contextual variables are more plausible boundary conditions as opposed to direct effects of individual behavior at work.

In terms of the outcomes of knowledge hiding, we have found meta-analytic evidence for the negative correlation with creativity and task performance. Evidence supports the self-damaging nature (“shoot-

ing oneself in the foot”) of hiding knowledge (cf. Černe et al., 2014), which means knowledge hiders’ performance in creative or non-creative tasks is impaired. This finding corroborates the vast amount of knowledge-hiding research that is based on the social exchange theory and norm of reciprocity and confirms this is an important future direction of the field as well, especially in light of the established positive associations between knowledge hiding and incivility, deviance, and deterioration of workplace relationships. On the other hand, innovation does not emerge as a significant outcome of knowledge hiding. This is in line with macro-innovation (Thayer et al., 2018; van Knippenberg, 2017) research beyond the focus on individual innovative work behavior, and is an outcome of team dynamics, resource allocation, and individual creative contributions. Turnover intentions, too, seem to be perhaps a too distal construct from knowledge-hiding behavior, indicating that the field should develop further by examining proximal and theoretically coherent outcomes of knowledge hiding.

Second, our supplementary mediation analyses also support knowledge hiding acting as a mediator for most specified relationships from job design, individual and leadership phenomena leading to task performance, organizational citizenship behavior, creativity, and deviance. This finding advances the field of knowledge hiding in an important way, as

the vast majority of studies treat knowledge hiding either as an antecedent of a positive or a negative outcome, or as an outcome (usually negative) of its own. Our meta-analytic mediation findings indicate that process models and those that propose knowledge hiding acts as an explanatory mechanism between two phenomena or behaviors are more than plausible, and additional theoretical and empirical work is warranted in this area.

Third, our meta-analytic review contributes to the broader knowledge management literature by balancing between knowledge sharing, a vast and developed field, and the growing and maturing knowledge-hiding field. Our findings empirically validate the orthogonality between knowledge hiding and lack of knowledge sharing. While they are conceptually and empirically two distinct constructs, the seeming similarity is a frequent concern of reviewers and editors alike. Furthermore, it is also evident that the nomological networks of knowledge hiding and knowledge sharing (Lim, 2021; Nguyen et al., 2019; Witherspoon et al., 2013) are distinct. Our findings will help authors interested in knowledge hiding strengthen their case beyond conceptual and definitional arguments. We hope that researchers can use our meta-analysis to refrain from having to revalidate that the two concepts are different, which happens all too frequently.

Fourth, on the basis of findings related to meta-analytic evidence on knowledge-hiding correlates, antecedents, outcomes, and mediators, this study also helps in empirically differentiating between knowledge hiding and related constructs that have proliferated without much empirical evidence of differential effects, such as knowledge hoarding or withholding. Our meta-analysis goes beyond previous review studies, not only because we use a bigger sample size of primary studies (see Appendix, Table A1), but also by avoiding conceptualization confounding of various distinctive constructs, such as knowledge hiding and knowledge hoarding. By focusing only on studies related to knowledge hiding, we provide some preliminary evidence of covariates and effect sizes of the knowledge-hiding nomological network, but at the same time also conceptual clarity of the possible effect sizes and directions of the nomological network, which truly relate to knowledge hiding per se, rather than other similar, yet distinct constructs.

Fifth, our study was submitted for publication almost at the same time as another meta-analysis (Arain et al., 2022) emerged. Although the studies were blind to each other's existence, we still contribute above and beyond this piece of research. First, we have a much larger sample and therefore an even more solid basis for our claims. Second, we test mediation

mechanisms, which the previous meta-analysis does not. Third, we provide a comprehensive overview of the existing knowledge-hiding reviews and one meta-analysis that will be appreciated by researchers in knowledge hiding in the years to come.

4.2 Future research suggestions

We have conducted a semantic analysis of suggested content-related limitations and future research directions by authors in the field using the same articles as in the meta-analysis to provide a more comprehensive insight into the possible future of knowledge-hiding research. Specifically, we have focused on the future directions section of each article and coded each possible future direction suggested by the article. Our findings suggest several opportunities, beyond merely identifying “hot topics.” Table 4 provides an overview of future research directions as mentioned in the primary articles of our meta-analytic review. Our coding has provided the following categories of potential future research directions. *New variables* refer to potential new variables to be included in the model or to change in the position of some variables in the model (e.g., from mediator to a moderator). In a few cases, this also relates to specific suggestions for moderators, mediators, predictors, or consequences of knowledge hiding. We argue that the choice of new variables should be much more theoretically driven than it was the case in the first decade of the knowledge-hiding field.

Context relates to adding new countries, industries, or groups to validate existing findings. Fortunately, empirical contexts that cover the domain of knowledge hiding do not suffer from the WEIRD (Western, Educated, Industrialized, Rich, and Democratic) phenomenon. Empirical context encompasses North America, Europe, Asia, and Oceania. The pluralistic development of the field turns out to be an advantage in the case of context coverage. *Research design* focuses on suggesting executing the models presented longitudinally. The *level of analysis* relates to theoretical and methodological suggestions, to add different levels to the model or collect data from different levels. *Sample* relates to issues about the sample, such as expanding the sample. *Methods* relate to suggestions to use different methods or triangulate the methods used with new ones to get a better sense of the data (e.g., content analysis, use of mixed methods, etc.). Under *replication*, the authors suggest replicating their study. *Dimensions* of knowledge hiding relate to calls to explore the facets of knowledge hiding separately. We have to acknowledge that it is not yet possible to conduct meta-analyses for separate knowledge-hiding dimensions as there are not

Table 4. Key future research directions mentioned by primary articles.

Future research direction	Count	New variables	Most frequent role	Count
New variables (Moderator – 9; New variables – 58; Mediators – 5; Consequences of KH – 4; Predictors of KH – 2).	78	Support (Supportive culture and climate, social support, supervisors support, support HR)	Moderator	5
Context	54	Political skill	Moderator	5
Research design (longitudinal)	54	Leadership styles and behavior	Moderator or mediator	5
Level of analysis	42	Moral disengagement and differences	Moderator or mediator	4
Sample	32	Trust (employees', cognitive, general)	Mediator	3
Methods	14	Supervision (abusive, role-modeling capacity /influence, supervisor-based self-esteem)	Moderator	3
Replication	11	Psychological safety	Moderator	3
Dimensions of knowledge hiding	10	Motivation (climate, intrinsic, mastery climate)	Moderator	3
Experimental design	7	Identification (department, group, organization)	Mediator	3
Tacit/explicit knowledge hiding	5	Goal interdependence and commitment	Mediator	3
Theories	5	Big five personality traits	Moderator	3
		Task interdependence	Moderator	3
		Climate (knowledge sharing, mastery motivational climate)	Moderator	3

Note: Content-related suggestions related to new variables are shaded in grey.

enough empirical studies distinguishing between rationalized, evasive, and “playing dumb” dimensions of knowledge hiding. Under *experimental design*, authors suggest complementing their research design with an experimental design. *Tacit/explicit knowledge hiding* relates to calls that knowledge-hiding behavior should be divided into hiding tacit or explicit types of knowledge and information. *Theories* explore the notion that other, previously unused theories (e.g., affective event theory) can be used to propose new research variables.

The vast majority of the authors suggested adding new variables, and the list is rather long. While this is a valid research direction, the peril of further conceptual proliferation and atheoretical development is imminent. The need to theoretically solidify the field after a decade of rapid growth is pertinent. Researchers could use this meta-analytic review as a complement to a set of recent systematic literature reviews in informing their theoretical choices. At a minimum, future research should avoid being atheoretical. At best, it should make sure to use overarching theories in further advancing the field. The most widely used theories so far are social exchange, cognitive theory of stress appraisal, conservation of resources, and coping. We find the affective events theory promising as it could explore knowledge hiding as an event taking place across time and varying within a person. Furthermore, our meta-analytical results suggest the importance of context and contextual theories. Emerging climates and designed HR practices, which form HR systems, can be potentially seen as contexts providing stimuli for how indi-

viduals should behave (including behaviors such as knowledge hiding). Another such contextual variable is culture, where its constituents at and across different levels (team, organizational, country) could be investigated. Researchers could potentially tap into multi-level theory to provide strong theorizing about such emerging contexts by appropriately describing the origin, definition/conceptualization, and operationalization of contextual variables in relation to knowledge hiding.

We still do not have a complete enough understanding of the nomological network. For instance, there are numerous opportunities related to understanding how various leadership styles are correlated with knowledge hiding. It is reasonable to expect that positive forms of leadership, such as transformational leadership and post-heroic leadership, could reduce the frequency of knowledge-hiding behaviors in teams and organizations. It is important to understand antecedents that could increase or decrease knowledge-hiding behaviors. In terms of outcomes, prior research has largely focused on behavioral outcomes at the individual level. We do not yet know how knowledge hiding relates to a large variety of outcomes at the team and organizational levels.

Future studies should not shy away from empirical contributions through replication and reporting non-findings and should also specifically focus on examining potentially differential effects (or non-effects) across knowledge-hiding facets; this is something that is clearly missing or is not yet studied sufficiently. These will contribute to strengthening the

meta-analytical evidence for such an important phenomenon as knowledge hiding.

In addition to theoretically solidifying the field, there are numerous methodological opportunities ahead. The vast majority of studies so far have been conducted at the individual level, with only four studies at the team level. The opportunities ahead lie in extending the team level, expanding towards the organizational level, and studying knowledge hiding across levels. It is important to see how the negative effects of knowledge hiding emerge at higher levels, such as the team level and organizational level, and vice versa, how higher-level phenomena influence knowledge hiding at lower levels. What is perhaps the most interesting is that knowledge hiding should be studied at the within-person level more often. Thus far, this has not been adequately studied, with only recent notable exceptions of Venz and Mohr (2022), Venz and Neshor Shoshan (2022), and Xia et al. (2022). Knowledge hiding is, by definition, an event-based phenomenon as it happens in response to the request of another person. Therefore, intrapersonal variance across a series of events and time points will be most welcome in future research.

Moreover, studies that capture the true nature of the dyadic phenomena of knowledge hiding using appropriate relational statistical techniques (social network analysis, relational modeling regressions) are almost completely absent. Using classical regression statistical techniques might not suffice to capture the extent of the knowledge-hiding dynamics (cf. Connelly et al., 2019) when relational aspects are in focus and can cause severe issues as well. For example, in standard OLS regression, observations are assumed to be independent, whereas dyadic data (such as the conceptualization of knowledge hiding) in essence strongly violates this assumption, severely biasing the standard error estimate (Wasserman & Faust, 1994). This suggests that statistical procedures that do not assume independence of observations (e.g., social network analysis, multi-level analysis) might be used to alleviate such problems.

5 Conclusion

After its first decade of existence, knowledge-hiding research warranted an integrative and comprehensive literature review backed with meta-analytical and semantic evidence. While we acknowledge and appreciate past efforts, we wanted to complement those with a meta-analytic review that solidifies the theoretical foundations, integrates the fragmented literature, and redirects the future growth of the knowledge-hiding field. Our sincere hope is that this paper has done exactly that by capturing

theoretical origins, meta-analytically validating the most salient antecedents, outcomes, and correlates of knowledge hiding, creating a quantitatively based nomological network of knowledge hiding, and suggesting theoretical and methodological advances for this quickly growing, but maturing field.

Even though our meta-analytical review is critical of the fragmented nature of the knowledge-hiding research in its first decade, we aim to be constructive and look forward with optimism. While facing some growth pains affecting any nascent domain, the field of knowledge hiding is addressing an important and long-overlooked phenomenon. It should not be surprising to witness rapid growth in the quantity of publications spread across the globe, scientific disciplines, theories, journals, and methodological traditions. Our sincere hope is to simultaneously build on the diversity and richness of those perspectives, while also solidifying the theoretical foundations for further growth toward quality and impact.

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Appendix

Table A1. Comparison of existing knowledge-hiding reviews.

Objectivity		Comprehensiveness and integrativeness				Keywords for search	Focus of the review
Methods/procedure	Meta-analysis	Biblio-metrics	Sample	Time period covered	Databases		
Škerlavaj, Cerne, Batišič (our study)	Yes	No	Meta-analysis: 342 primary documents, 131 studies and 147 samples with 47,348 participants included	January 2012–March 2021	EBSCO Host, Emerald, Jstor, Oxford Press, ProQuest, Sage Journals, Science Direct, Springer Link, Taylor and Francis, Web of Science	Only works related to: management, library science, business, psychology applied, information systems, artificial intelligence, psychology multidisciplinary, computer science theory and methods, hospitality leisure, sports tourism, communication, ethics, educational research, nursing, operations research management science, political science, psychological social, economics, ergonomics, multidisciplinary sciences, psychological experimental, social sciences interdisciplinary Growth curve: 2012–2020	Nomological network, mediating mechanisms, comprehensive overview of meta-analyses and systematic literature reviews

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Table A1. (continued)

Objectivity	Comprehensiveness and integrativeness					Keywords for search	Focus of the review	
	Methods/procedure	Meta-analysis	Biblio-metrics	Sample	Time period covered			Databases
Arain et al. (2022)	Meta-analysis	Yes	No	Meta-analysis: 104 studies with 31,822 participants included	October 2010–August 2021	Google Scholar, JSTOR, APA PsycArticles, ProQuest central, ProQuest dissertation and thesis, Informa, Scopus, Taylor & Francis, and Wiley Online Library	(1) knowledge hiding, (2) hiding knowledge, (3) evasive hiding, (4) playing dumb, (5) rationalized hiding, (6) knowledge withholding, and (7) withholding knowledge.	Nomological network
Anand et al. (2020)	Systematic reviews concerned with synthesis	No	No	66 articles	–	Scopus, ProQuest, EBSCO and Google Scholar	Knowledge hiding	Events leading to knowledge hiding
Anand et al. (2021)	Systematic literature review	No	No	84 articles	Between 2012 and October 2020	Scopus	“Knowledge Hiding” “Hiding Knowledge” “Knowledge Hoarding” “Knowledge Withholding” “Knowledge Detention” “Knowledge Concealment” “Non-sharing Knowledge” “Knowledge Sharing Barrier” “Knowledge Sharing Resistance” “Knowledge Sharing Disengagement” “Knowledge Sharing Obstruction” “Knowledge Sharing Hostility” “Knowledge Sharing Blockage” “Organizational Knowledge Hiding” “Organizational Knowledge Hoarding” “Organizational Knowledge Withholding”	Systematic research on knowledge hiding

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Table A1. (continued)

Objectivity		Comprehensiveness and integrativeness					Focus of the review	
Methods/procedure	Meta-analysis	Bibliometrics	Sample	Time period covered	Databases	Additional filtering criteria	Keywords for search	
Di Vaio et al. (2021)	No	No	117 articles	1988–2020	Scopus, Web of Science, Google Scholar	Document types: Article, Book Chapter, Conference Papers, and Article in Press	"Knowledge hiding" AND "Knowledge Management" AND "Knowledge hiding" AND "Business Organization" OR "Board of Directors" AND "Knowledge hiding" AND "consequences" AND "Knowledge hiding" AND "strategic performance"	Systematic literature review on how KH contributes to individuals, groups, and the business processes of corporate organizations specifically with regards to improving employee performance, strategic performance, and the organization's overall knowledge management system (KMS). Research themes of knowledge hiding include five clusters: concept and dimensions, antecedents, consequences, theories, and influence mechanisms Workplace incivility and knowledge hiding
He et al. (2021)	Systematic review process	Partially, mostly productive indicators	81 articles	2012–2020	Web of Science Core Collection	Excluded those that belonged to disciplines such as information management	"Title = knowledge hiding" or "Title = knowledge withholding"	Research themes of knowledge hiding include five clusters: concept and dimensions, antecedents, consequences, theories, and influence mechanisms Workplace incivility and knowledge hiding
Irum et al. (2020)	–	No	–	2000–2019	EBSCO and Google Scholar	Articles listed as A* and A under the ABCD journal list	"Workplace incivility, 'uncivil behaviour', 'negative workplace behaviour, and workplace mistreatment"	Workplace incivility and knowledge hiding
Issac et al. (2021)	Morphological analysis	No	68 articles	–	Scopus	Only works related to business and management disciplines	"Knowledge hiding" or "knowledge withholding"	Systematic research on knowledge hiding

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Table A1. (continued)

	Comprehensiveness and integrativeness					Focus of the review			
	Objectivity Methods/ procedure	Meta- analysis	Biblio- metrics	Sample	Time period covered		Databases	Additional filtering criteria	Keywords for search
Oliveira et al. (2021)	Systematic literature review	Partially, mostly productive indicators	No	50 articles	Until July 20, 2020	Scopus, Web of Science, Emerald, Direct, Emerald, and Wiley Online databases	Only journal articles in the English language	(“knowledge hid*” and “survey”) or (“knowledge hoard*” and “survey”), in the “title, abstract and keywords” option in Scopus and “topic” in the Web of Science. The keywords “KHo” or “knowledge hoard” or “knowledge hide,” or “KH” and “survey” were used in Wiley Online. In Science Direct and Emerald, the keywords were “Kho,” “knowledge hoard,” “knowledge hide,” “KH” one at a time, and articles involving “survey” were selected manually.	Knowledge Hiding and Knowledge Hoarding, and the relationship with Knowledge Sharing.
Rezwan and Takahashi (2021)	Systematic literature review process	No	No	88 empirical articles	1900 onwards for Web of Science; 1960 for Scopus	Scopus, Web of Science	Excluded all books, book chapters, meeting abstracts, and articles that were not in English Checked the title and abstracts of the studies in their Excel spreadsheet database utilizing keywords in the filter function (i.e., “hide,” “hiding,” “employee,” “organization,” “organisation,”	WOS search: TOPIC: (knowledge hid) OR TOPIC: (knowledge hiding) OR TOPIC: (knowledge withhold) OR TOPIC: (knowledge withholding) Timespan: 1900–2021. Databases: WOS, KJID, RSCI, SCIELO. Scopus search: TITLE-ABS-KEY (knowledge AND hid) OR TITLE-ABS-KEY (knowledge AND hiding) OR	Use a cognitive–motivational–relational (CMR) theory of emotion to create a framework for other knowledge-hiding studies’ findings.

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Table A1. (continued)

Objectivity		Comprehensiveness and integrativeness				Keywords for search	Focus of the review
Methods/procedure	Meta-analysis	Time period covered	Databases	Additional filtering criteria	Keywords for search		
Ruparel and Choubisa (2020)	Narrative analysis	No	2008–2019	Web of Science, Scopus, Google Scholar, Emerald, Wiley, SAGE, EBSCO, and ProQuest	"hide knowledge," "hiding knowledge," "hid," "knowledge hid," "knowledge-hid," "knowledge withhold," "knowledge-withhold," "knowledge," "withholding knowledge," and "withhold") Excluded the qualitative, theoretical, and review studies	TITLE-ABS-KEY (knowledge AND withhold) OR TITLE-ABS-KEY (knowledge AND withholding).	Systematic and retrospective review
Silva de Garcia et al. (2022)	Content Analysis	No	-	Web of Science and Scopus	Excluded the qualitative, theoretical, and review studies	"knowledge hiding," "knowledge hiding among organizations," and "knowledge hiding in employees"	Integrative framework
Strik et al. (2021)	Review table	No	-	Business Source Complete, SocINDEX, ERIC, and PsycInfo	For EBSCO Business Source Complete, they enabled searches in the engine "SocINDEX with full text." They also applied the features "apply related words," "apply equivalent subjects,"	"knowledge hoarding," "knowledge hiding," and "knowledge withholding"	Antecedents of knowledge withholding

(continued on next page)

Table A1. (continued)

Objectivity Methods/ procedure	Comprehensiveness and integrativeness				Keywords for search	Focus of the review		
	Meta- analysis	Biblio- metrics	Sample	Time period covered			Databases	Additional filtering criteria
Xiao and Cooke (2019)	No	No	52 articles	1997–2017	EBSCO, Web of Science, ProQuest, Emerald, Springer, SAGE, and Wiley. They used the Chinese equivalents of the English keywords to search CNKI (a major database of Chinese journals).	and 'scholarly (peer-reviewed) journals.' In the ERIC engine, they used the default settings and enabled the feature 'peer reviewed only.' The PsycInfo engine was used with default settings plus the additional selection features of 'empirical evidence' in the methodology box and 'peer- reviewed journals.'	'knowledge hiding,' 'knowledge withholding,' 'information hiding,' 'information withholding,' 'data withholding,' 'partial knowledge sharing,' 'knowledge sharing hostile,' 'knowledge hoarding'	Knowledge hiding in China