The Double Cognitive Bias of Mistakes: A Measurement Method

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Abstract: There is no learning without mistakes. However, making mistakes among knowledge workers is still seeing shameful. There is a clash between positive attitudes and beliefs regarding the power of gaining new (tacit) knowledge by acting in new contexts and negative attitudes and beliefs toward accompanying mistakes that are sources of learning. These contradictory attitudes create a bias that is doubled by the other shared solid belief that "BOSSES NEVER MAKE MISTAKES." The double cognitive bias of mistakes introduced by Kucharska and Bedford (2023) is assumed in this paper to harm organizational learning and collective intelligence development. To justify this point empirically in this paper, the authors propose a procedure enabling the measurement of the double cognitive bias of mistakes. Moreover, to validate the proposed method, authors empirically examine the influence of the KLC cultures' synergy on knowledge sharing and organizational intelligence and compare obtained results with the effect observed for the sample free of the double bias of mistakes. Novelty: this study is the first to propose identifying the double bias of mistakes and empirically exposing its impacts.

Keywords: the cognitive bias, the cognitive bias of mistakes, the double bias of mistakes, KLC cultures, knowledge culture, learning culture, collaborative culture, company culture, organizational intelligence, collective intelligence, fixed mindset, growth mindset, change adaptability, tacit knowledge sharing, explicit knowledge sharing, trust

1. Introduction

The bias of mistakes essence is rooted in the specific cognitive bias (Tversky and Kahneman, 1981) named the framing effect (Clark, 2009; Druckman, 2001a-b; Plous, 1993). The bias of mistakes is a bias caused by the positive claims about mistakes as a natural part of humanity but at the same time of the negative experiences of their consequences, resulting in the negative framing effect of mistakes (experiences affect us stronger than statements). The framing effect is observed if negative or positive connotations of the particular phenomenon (here: mistakes) impact its perception and judgment. The framing result is one of the most significant biases influencing situational judging and decision-making (Thomas and Millar, 2011). So, the negative framing effect of mistakes can be then very powerful – it can affect situational judgment and decisions. Therefore, it is worth studying more-in depth.

The framing, negative effect of mistakes perception - the bias of mistakes introduced by Kucharska and Bedford (2023a), can make individuals' learning from mistakes problematic (Hull, 1930). Precisely, according to the Transformative Learning Theory (Mezirow, 1995), which claims that adult learning happens thanks to modified interpretations of the meanings of personal experiences and frames of reference through critical reflection, where critical reflection is seen as a result of "intuitively becoming aware that something is wrong with the result of one's thought, or challenging its validity through discourse with others of differing viewpoints and arriving at the best-informed judgment" (Mezirow, 1995, p. 46) – mistakes reflectivity is, from this point, a critical factor for learning. If mistakes are denied or ignored – then they cannot be a source of reflection and learning for anybody, no for mistakes maker, nor for anyone else. Hidden mistakes bring harm and are a waste of value rather than a precious lesson-learned source (Kucharska and Rebelo, 2022a). It is in line with the concept of negative resource spirals (Hobfoll et al., 2018), according to which the loss of one resource (e.g., knowledge from mistakes) can generate losses of other resources. A lack of learning from experience is a waste. Mistakes are precious, common human experiences. Without accepting them, we can neither understand their meaning nor learn from them

The double bias of mistakes introduced by Kucharska and Bedford (2023a) concerns collective organizational learning mainly and, according to those authors, significantly impacts organizational intelligence (Kucharska and Bedford, 2023b). Briefly, the double bias of mistakes is an upshot of the negative framing effect of mistakes that is additionally doubled by the shared belief that "BOSSES NEVER MAKE MISTAKES" grounded in fixed mindsets (Dweck, 2017).

Fixed and growth mindsets and organizational learning troubles

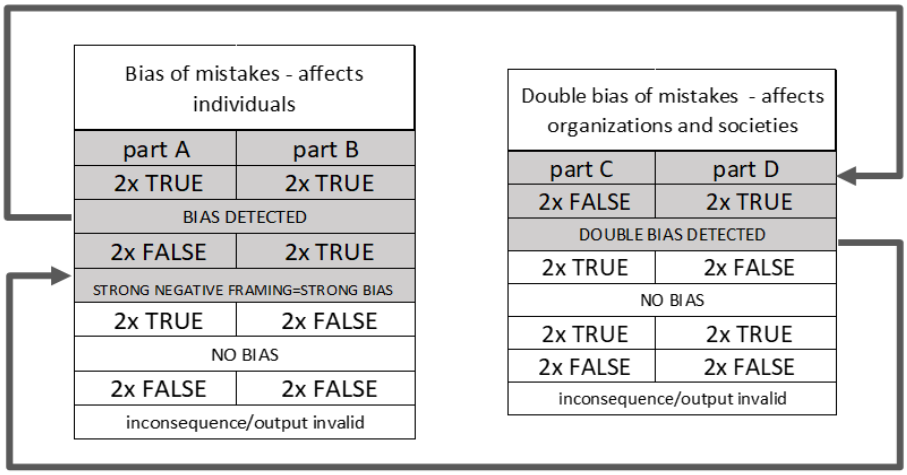
There is a chain of consequences of the existing double bias. First, the fear of personal consequences of mistakes may lead to a cultivation of a fixed instead of growing mindset domination in society (Dweck, 2017; Athota, 2021). Mindset (mental model) is a "psychological construction" comprised of an internally held structure (Vazquez et al., 1996) that shapes a particular person's perception of things and determines the entire understanding of the world (Shih and Alessi, 1993; Doyle and Ford, 1998). Such personal perception and understanding shape attitudes and behaviors towards everything, including those important for this study's mistakes that influence learning abilities. So, growth mindsets are learning-oriented (constant progress), while fixed mindsets are image-oriented (constant confirmation of self-perfection). As a consequence, a fixed mindset makes people non-learners in the long run perspective (Dweck, 2017). Learning-oriented mindsets love a challenge, believe in learning effort, are resilient in the face of setbacks, and are creative (Dweck, 2017, p. 19). Fixed mindsets perceive failure as a lack of intelligence, so any validation of own actions is risky. They often believe avoiding any challenge that can expose setbacks and cause a social rejection of the revealed lack of perfection is better than taking the risk of failure because "bosses never make mistakes," – people believe. So, bosses avoid the risk of making mistakes for two reasons: first reason – to keep their positive self-image; second, to prove to others they are fully justified to keep their positions because there exists the shared belief that "bosses never make mistakes" – they are "perfect."

It is why we have a crisis of transformational leadership. Leaders with fixed mindsets avoid any risk of losing their image, so "fixed mindset" dominates in led by the organizations. Organizations with dominated fixed mindsets and not accepting mistakes as a potential source of learning can face serious troubles in developing shared collective intelligence, as stated by Kucharska and Bedford (2023a-b). So, bosses' fixed/growth mindsets shape the organizational shared mindset (company culture) that next affects the organizational ability to learn and adapt to changes. Transformational leaders are identified as those who create a company culture that fosters learning from mistakes and supports adaptability to change (Kucharska and Rebelo, 2022b; Kucharska et al., 2022; Samhran et al., 2022). Feuerstein et al. (1979) defined intelligence as the ability to adapt to change. Following him, the organizational capacity to adapt to change is seen in this study as organizational intelligence.

To empirically prove that a double bias of mistakes makes organizational learning problematic, there is a need to introduce a method enabling measurement of the double bias of mistakes first, next to prove its negative influence on collective intelligence creation. The next section presents this method's details.

1.1 Method of the double bias of mistakes measurement

Since the essence of the doubled bias of mistakes is a negative attitude: first, towards mistakes generally, second, towards bosses' mistakes, then the point of its measurement method is denoting an instrument enabling measuring these two attitudes simultaneously (in the same questionnaire). Table 1 presents the proposed procedure. Whereas Figure 1 visualizes it.



A: *mistakes are a natural part of learning or experimenting; **To err is human
B: *mistakes are negatively seen; **It is better to hide than claim a mistake
C: *mistakes are reported and openly discussed; ** mistakes are seen in my organization as a natural consequence of the process of learning, searching for new solutions, and experimenting
D: *my boss expects to be seen as always right (fixed mindsets); **my boss does not accept mistakes (fixed mindset)

Figure 1: The detection of double bias of mistakes - scheme of analysis and mutual interdependence

Table 1: The double bias of mistakes measurement method

	Definition	Statements	Procedure
Bias of mistakes **(Kucharska and Bedford, 2023)**	It is a bias caused by the former strong framing effect or caused by the contradiction. Precisely positive claims about mistakes as a natural part of learning and humanity but at the same time of the negative experiences of their consequences, resulting in the negative framing effect of mistakes (experiences affect us stronger than any statements).	A. -OPINION In your opinion, the following statements are true or false? • Mistakes are a natural part of learning or experimenting • To err is human B. EXPERIENCE Regarding your experiences: • Mistakes are negatively seen • It is better to hide a mistake	These statements can be credited to any questionnaire when we aim to analyze the mistake's biased impact on the explored phenomenon. Still, both parts A and part B should be included in the questionnaire separately (not one by one). The essence of the bias of mistakes detection is the observed **contradiction** or **strong negative framing** between OPINIONS (part A) and EXPERIENCES (part B). For example, suppose respondents answer positively to A (2xtrue) and part B (2xtrue). In that case, we observe the contradiction that causes the cognitive bias, which is next transformed into a framing effect as a stronger upshot of experiences above opinions. The strong framing effect based on the prior intense negative experiences is also possible to detect A (2xfalse) and B (2xtrue) cases.
Double bias of mistakes **(Kucharska and Bedford, 2023)**	It is an upshot of the negative framing effect of mistakes that is additionally doubled by the shared belief that "BOSSES NEVER MAKE MISTAKES" grounded in fixed mindsets dominated in the particular group, organization, or society.	Are the following statements true or false regarding your current workplace/group/society? C. ORGANIZATION/GROUP etc. • Mistakes are reported and openly discussed • Mistakes are seen in my organization as a natural consequence of the process of learning, searching for new solutions, and experimenting D. LEADER • My boss expects to be seen as always right • My boss does not accept mistakes	These statements can be credited to any questionnaire when we aim to analyze the doubled mistake's biased impact on the explored phenomenon. Still, parts A and B should be included in the questionnaire separately (not one by one) to indicate the potential doubled bias of mistakes more naturally. This is important because the essence of the double bias of mistake detection in the organization is the observed **compatibility** between ORGANIZATION (part C) and BOSS (part D) negative framing effect of mistakes. For example, suppose respondents answer negatively to A (2xfalse) and positively to part B (2xtrue). In that case, we observe the framing effect of the mistakes bias doubled by the boss's fixed attitude.
ATTENTION: To detect the bias more naturally, researchers should care about the certainty and reliability of giving statements. Therefore, intentionally A-B-C-D parts should be separated in a questionnaire (not displayed in a sequence one by one) to avoid fast and consequent answers without proper consideration. Moreover, statements should be formulated -one part in a positive and the other in a negative way to avoid manipulation by the statement tone.			

1.2 Method validation procedure

The statements above were incorporated into the questionnaire dedicated to knowledge workers to validate the method. The sampling method and sample characteristics details come from Kucharska and Bedford's (2023b) study and it is presented below.

Sampling procedure: This study was targeted at Polish knowledge workers; therefore, qualified respondents declared that their work's first input and output is knowledge. Moreover, to secure the respondents' familiarity with their organizations' issues, we qualified only those who worked a minimum of one year for their current employer. Data were collected in March 2023 by applying the CAWI method by Biostat® Poland.

Sample characteristics: The sample is composed of 640 Polish knowledge workers: 306 specialists and 334 managers; 329 women and 311 men representing mostly private (77%) companies from different sectors to

illustrate the general view on Poland (dominating sectors: production and knowledge services 19% each). Measures: Respondents referred to the majority of questions using a 7-point Likert scale. Appendix 1 presents measured constructs scales and their sources. Obtained reliabilities are given in Table 1. Additionally, Appendix 2 presents the Cross-Loadings Matrix. It is because two of the nine used scales (the organizational Trust and the organizational IQ) were invented and validated by authors. The Cross-Loadings Matrix exposes that the used scales do not overlap. Control variable (CV): Trust was input into the model as CV; to do so, the composite variable was created based on the scale measures.

Method of analysis: Structural Equation Modeling (SEM) with the use of SPSS Amos 26 software (Byrne, 2016).

Sample quality: Kaiser–Meyer–Olkin (KMO) test: .957, the total variance extracted: 75%, and Harman one factor test: 44% justify the good quality of the TOTAL sample.

Furthermore, the self-reporting questionnaire has been created to examine the KLC culture's influence on tacit knowledge sharing and change adaptability - organizational intelligence (Kucharska and Bedford, 2023b). According to the given above procedure, to detect the bias more naturally and intentionally, A-B-C-D parts were displayed separately in a questionnaire to avoid fast and consequent answers without careful consideration. Next, all cases (questionnaires) gathered before analysis were divided into two groups: Group A – with the double bias detected and Group B – without the bias (no bias). The detection procedure (Figure 1, Table 1) was performed according to the patterns: [A(2xtrue)B(2xtrue)C(2xfalse)D(2xtrue)] and [A(2xfalse)B(2xtrue)C(2xfalse)D(2xtrue)]; 'no bias' was detected by pattern: [A(2xtrue)B(2xfalse)C(2xtrue)D(2xfalse)]. Finally, questionnaires (cases) with inconsequent answers were excluded as invalid. The total sample size was n=640 cases. Group A (the double bias) size was 184 cases; Group B (no bias) n=327 cases. It means that 139 respondents exposed inconsequences in their answers regarding mistakes. It can be interpreted as respondents' negligence or an effect of the mistakes bias, especially since the entire sample quality was positively verified (Kucharska and Bedford, 2023b). However, focusing strictly on the proposed method validation, these 139 cases were excluded from further analysis. Consequently, since the total sample, after the exclusion, became smaller n=511, and additionally divided into two groups, A n=184 and B n=327, the model by Kucharska and Bedford (2023b) was simplified to enable the data analysis using the same structural equation modeling SEM method. The conceptual framework of the original model is given in Kucharska and Bedford's (2023b) study, and details of constructs included in its simplified version are presented below in Table 2 below.

1.2.1 Table 2: Scales and their sources

1.2.1 Knowledge culture *1.2.1 (Kucharska and Bedford, 2020)*	• All employees perceive knowledge as a valuable resource. • We have a common language to support knowledge exchange. • We are encouraged to share knowledge, ideas, and thoughts. • We care about the quality of knowledge that we share.
1.2.1 Learning culture *1.2.1 (Kucharska and Bedford, 2020)*	Learning climate component • All staff demonstrates a high learning disposition. • We are encouraged to engage in personal development. • We are encouraged to implement new ideas every day. • We are encouraged to engage in seeking new solutions. Mistakes acceptance component • People know that mistakes are a learning consequence and tolerate it up to a certain limit. • Most people freely declare mistakes. • We discuss problems openly without blaming others. • Mistakes are tolerated and treated as learning opportunities.
1.2.1 Collaborative culture *1.2.1 (Kucharska and Bedford, 2020)*	• My company supports cooperation between workers • Cooperation among the different duties, teams, and departments was encouraged • Co-workers volunteer their support even without being asked People support each other
1.2.1 Change adaptability (org. intelligence - IQ) *1.2.1 (Kucharska and Bedford, 2020)*	• We are flexible to changes • We can adjust ourselves to changes • We adapt to changes easily • We used changes
1.2.1 Tacit knowledge sharing *1.2.1 (Kucharska and Erickson, 2023)*	• I share knowledge learned from my own experience • I have the opportunity to learn from the experiences of others • Colleagues share new ideas with me • Colleagues include me in discussions about the best practices

1.2.1 Explicit knowledge sharing *1.2.1 (Kucharska and Bedford, 2023b)*	• There is a formal policy encouraging knowledge sharing at my place of work. • Knowledge is shared among people in my team and division. • Other teams and divisions share knowledge with us. • We share our knowledge with other teams and divisions.
1.2.1 TRUST *1.2.1 (Kucharska and Bedford, 2023b)*	• I trust people at work. • People in my team trust one another. • People in my division trust one another. • People in my entire organization trust one another.
1.2.1 External, market innovations *1.2.1 (Kucharska and Erickson, 2023)*	• We provide competitively superior innovations to our clients. • Our innovations are perceived positively by our clients. • We are better than our competitors at introducing innovations. I am proud of our innovations.
1.2.1 Bias of mistakes -personal *1.2.1* *1.2.1 Authors' method given in this atudy*	• Mistakes are a natural part of learning or experimenting/A • To err is human/A • Mistakes are negatively seen/B • It is better to hide than claim a mistake/B
1.2.1 Double bias of mistakes - communal: group/organization/society *1.2.1* *1.2.1 Authors' method given in this study*	• Mistakes are reported and openly discussed/C • Mistakes are seen in my organization as a natural consequence of the process of learning, searching for new solutions, and experimenting/C • My boss expects to be seen as always right/D • My boss does not accept mistakes/D

2. Validation results

The proposed method is validated through comparison among obtained results by based model by Kucharska and Bedford (2023b) measured based on the TOTAL sample (n=640 cases) and models based on sub-samples identified through the grouping questionnaires free of mistakes bias (n=327 cases), and cases with the identified doubled bias o mistakes (n=184 cases), accordingly to the proposed in this paper method. To compare results, the qualities of both sub-samples were first assessed, and next, models were performed and analyzed.

Samples quality Kaiser–Meyer–Olkin (KMO) test: for the sample free from the double bias and the sample with the identified double bias of mistakes results are: .952/.918 respectively; the total variance extracted: 65%/67% respectively and, Harman one factor test: 48%/42% respectively – all these results justify the good quality of both sub-samples.

The evaluation of the models' qualities was initially conducted based on constructs measurements consistency tests such as the average of variance extracted (AVE), composite reliability (CR), and Cronbach's alpha. AVE exceeded 0.52 for all constructs, which was acceptable (Hair et al., 2017). Cronbach's alpha test was used to confirm the consistency of the construct measurement model. The alpha coefficient was greater than 0.71 for all constructs, which was adequate (Hair et al. 2017, pp. 112). The CR was greater than 0.72 for all loadings, exceeding the required minimum of 0.7 (Hair et al., 2017). The square root of each construct's AVE exceeded the correlations between the majority pairs of distinct constructs but not for all, and this situation requires comments.

The based sample exposes a strong correlation between CC-LCc and CC-EKS (in red in Table 3a). It means a strong interdependency exists between collaborative culture, learning climate, and knowledge sharing in Poland. The sub-sample without the double bias of mistakes (Table 3b) also exposes a very strong correlation between tacit knowledge sharing, organizational intelligence, and external innovations. At the same time, the sub-sample exposing the double bias of mistakes (Table 3c) exhibits a robust correlation between explicit knowledge and organizational intelligence, and external innovations. Altogether endangers, that in Poland exists a strong interdependency between collaborative culture, learning climate, and knowledge sharing, that the double bias of mistakes makes explicit knowledge a focal source of intelligence and innovations, whereas in a sample free from the double mistakes bias – the tacit knowledge is exposed as strongly correlated to organizational intelligence and external innovations creation. That suggests that the double bias of mistakes blocks tacit knowledge and overrates explicit knowledge– it is because organizational intelligence and innovations strongly correlate to the explicit knowledge in this sample. Tacit knowledge is proven to be significantly better than explicit knowledge sources of innovations (Kucharska, 2021a-b).

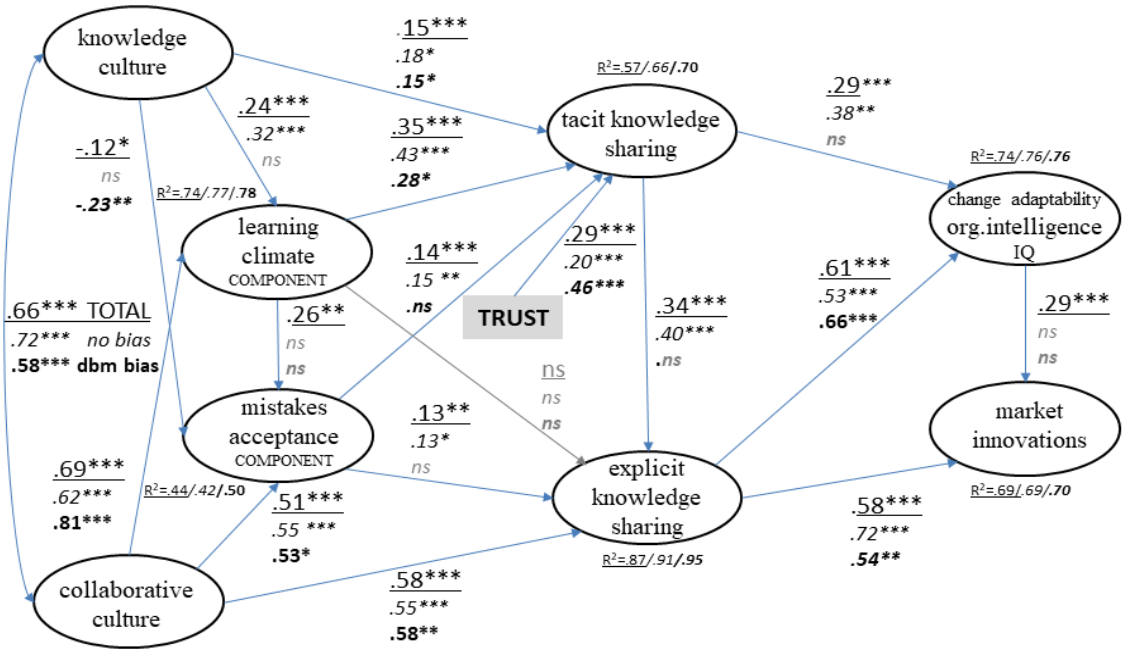


Figure 2: Method validation results

Note: n=640/n=327/**n=183** (TOTAL/no bias/**dbm bias**) ML; χ2=1043.45(331)/*700.082(305)*/**638.55(305)** CFI=.941/.939/**.896** TLI=.933/.930/**.880** RMSEA=.059/.063/**.078;** Cmin/df=3.15/2.27/**2.09**; p<.05 **p<.01 ***p<.001; ns-not significant result; **dbm bias – the double bias of mistakes**

Table 3: Basic statistics, obtained AVE root square, and correlations between constructs

a) TOTAL sample

	Mean	SD	AVE	CR	Cronbach alpha	T	CC	KC	LCc	LcM	TKS	EKS	IQ	InnE
T	3.59	2.01	.57	.79	.80	**.753**								
CC	3.68	2.09	.56	.86	.83	.677	**.752**							
KC	4.23	2.52	.71	.88	.88	.499	.657	**.845**						
LCc	3.74	2.15	.57	.79	.83	.586	.846	.693	**.753**					
LcM	3.12	1.7	.80	.94	.94	.437	.651	.398	.608	**.894**				
TKS	3.61	.07	.66	.85	.87	.637	.69	.606	.718	.543	**.813**			
EKS	3.56	1.98	.55	.79	.78	.668	.902	.642	.719	.692	.719	**.742**		
IQ	3.64	1.98	.59	.85	.85	.592	.75	.567	.708	.58	.786	.742	**.765**	
InnE	3.59	1.96	.54	.78	.77	.557	.738	.535	.678	.567	.697	.722	.758	**.732**

Note: n=640 KC-knowledge culture, LCc-learning culture climate component, LCm-Learning culture mistakes acceptance component, CC-collaborative culture, TKS-tacit knowledge sharing, EKS-explicit knowledge sharing, T-trust, IQ- organizational change adaptability, InnE – market (external) innovations. Source: Kucharska and Bedford (2023b).

b) No double bias of mistakes detected sample

	Mean	SD	AVE	CR	Cronbach alpha	T	CC	KC	LCc	LcM	TKS	EKS	IQ	InnE
T	3.49	1.98	.57	.79	.80	**.753**								
CC	3.50	2.00	.57	.86	.86	.674	**.758**							
KC	4.30	2.40	.74	.90	.89	.535	.721	**.862**						

	Mean	SD	AVE	CR	Cronbach alpha	T	CC	KC	LCc	LcM	TKS	EKS	IQ	InnE
LCc	3.70	2.50	.57	.79	.83	.587	.848	.765	**.753**					
LcM	2.8	1.1	.82	.95	.95	.438	.651	.455	.595	**.908**				
TKS	3.60	2.01	.65	.85	.85	.612	.725	.683	.743	.573	**.809**			
EKS	3.50	1.88	.55	.79	.80	.66	.907	.713	.732	.703	.722	**.741**		
IQ	3.50	1.89	.63	.87	.87	.578	.75	.632	.729	.586	.827	.739	**.791**	
InnE	3.49	1.96	.60	.82	.82	.549	.748	.594	.692	.581	.856	.728	.74	**.772**

Note: n=327

c) The double bias of mistakes detected sample

	Mean	SD	AVE	CR	Cronbach alpha	T	CC	KC	LCc	LcM	TKS	EKS	IQ	InnE
T	3.59	2.01	.57	.79	.80	**.753**								
CC	3.80	2.01	.58	.87	.85	.66	**.764**							
KC	4.19	2.40	.66	.85	.851	.485	.578	**.811**						
LCc	3.91	2.01	.57	.79	.812	.593	.881	.586	**.753**					
LcM	3.46	1.7	.77	.93	.93	.427	.673	.273	.652	**.878**				
TKS	3.70	1.90	.61	.82	.83	.753	.714	.594	.716	.511	**.782**			
EKS	3.71	1.90	.52	.76	.77	.729	.931	.607	.744	.673	.768	**.719**		
IQ	3.77	1.90	.56	.83	.83	.651	.791	.536	.742	.571	.782	.866	**.746**	
InnE	3.71	1.80	.46	.72	.71	.604	.759	.501	.707	.548	.725	.821	.731	**.680**

Note: n=184

The given model's results comparison by the prism of employed samples (Figure 2) endangers that the double bias of mistakes in organizations strengthens the negative influence of knowledge culture on the mistakes acceptance component of a learning culture. Moreover, its influence on the learning climate component is not significant. The knowledge culture correlation with collaborative culture is weaker than observed for the TOTAL and the 'no double bias' samples. So, the entire KLC cultures synergy approach proposed for knowledge-driven organizations by Kucharska and Bedford (2023a-b), when analyzed through the prism of the doubled cognitive bias of mistakes (DBM), reveals that DBM strengthens knowledge culture and weakens collaborative and learning cultures. It is visible in the entire KLC influence on knowledge sharing that is barely noticeable. Finally, DBM diminishes to zero tacit knowledge impact on organizational intelligence. This is clear in organizations with DBM-dominated organizational intelligence, and market innovations are driven by explicit knowledge only. Bearing in mind the existing body of knowledge (Kucharska 2021a-b), it is clear that such organizations, relying, in fact, mostly on old and verified knowledge and methods, have chances for incremental rather than radical innovations. This statement, however, requires empirical confirmation.

The model developed by Kucharska and Bedford (2023b) was employed here as a testing space for the method of the double bias identification introduced in this paper. Testing model initial results (analyzed without considering the DBM prism) exposed that the KLC cultures foster knowledge sharing and intelligence development in the knowledge-driven organizations that support innovativeness. The authors concluded that knowledge sharing, organizational intelligence, and innovativeness are vital benefits of the KLC culture's synergy. They noticed that trust (imputed as a control variable in the model) strengthens this effect. Based on the obtained results, trust influence is even more substantial in the model based on the DBM-dominated sample than in the original model and model "free from DBM'. In practice, trust is a huge influencer, and lack of trust is a blocker of the DBM-dominated organizations. Organizations without DBM take full advantage of KLC synergy that enables the smooth creation of tacit knowledge fostering organizational intelligence development. So, DBM should be considered a severe blocker of organizational learning, intelligence, and innovativeness.

3. Practical implications

There are profound practical implications regarding the exposed effect of the double bias of mistakes dominated in organizations. The presented findings provoke a severe rethinking and probably also re-framing of the organizational approach to mistakes. Enterprises exposing a “zero tolerance to mistakes” in divisions and areas different than production or operations can face severe troubles with the constant ability to create a competitive advantage that comes from change adaptability (intelligence) and innovations developed in the long run perspective. Collective intelligence essence, seen as a network of knowledge workers’ brilliant minds' that collaborate smoothly, is a severe organizational potency that needs to be activated. The double bias of mistakes can be a serious blocker of it because of its negative impact on collective learning.

4. Scientific implications

This study is the first that introduced the method enabling the identification of persons and organizations affected by the DBM to measure its influence on different aspects of human, organizational, or societal life. However, this study exposed how DBM blocks collective intelligence. Other studies are needed to expose other severe impacts that DBM can cause. Furthermore, the given research is based on a Polish knowledge workers sample. Polish historical backgrounds, such as, e.g., the nazists’ occupation and the subsequent soviet occupation, cast shadows on how society perceives mistakes (mistakes may cost lives, and the shared national traumas affect generations). Also, the dominant Catholic religion in Poland narrates the mistake (sin) in a way that may sometimes support DBM when exposing stronger "fault" than "mercy." Summing up, there can be many national or local specifics that can strengthen or weaken DBM. At the same time, DBM consequences can also differ among organizations, societies, regions, and nations. Furthermore, such studies are worth being performed to fully understand how the DBM impacts countries, cultures, institutions, organizations, and communities and how to deal with the DBM impact to set free the collective intelligence.

Another important line of further research inspired by this study’s findings cumulates around the question: How can organizations deal with the DBM to perform better? Moreover, how the AI development can influence the collective intelligence of the organization? Furthermore, how AI deals with mistakes bias? Is the AI the double bias of mistakes or any other bias-free? These interesting questions require further investigation.

5. Limitation

The conducted validation of the method exposed that it requires comparatively large samples. It is because “mistakes” are very sensitive issues. Therefore, to detect a DBM and next examine it in complex structures and compare effects with and without DBM detected – that helps fully understand the particular phenomenon and using, e.g., the SEM method, it is recommended to apply samples 400 and up per cohort.

Moreover, in this manuscript, the lack of consistency in the respondent's answers regarding mistakes perception and their experiences with mistakes at work was qualified as an invalid answer. As a result, the particular case (questionnaire) was excluded from further analysis. Bearing in mind the fact that the earlier verification of the sample quality (each questionnaire) was positive. It might be that the lack of consistency in mistakes perceptions and mistakes experiences at work even if other answers were consistent - should be seen as precisely a result of the mistakes bias.

6. Conclusion

The proposed method to measure the double bias of mistakes was positively validated. Furthermore, the method was validated and enabled to compare the effect of the DBM on the relation between KLC synergy and organizational intelligence and innovativeness. Findings revealed the severe impact that DBM puts on organizational intelligence by weakening collaborative and learning cultures and blocking tacit knowledge creation. These findings encourage further, deeper DBM exploration. Such questions: How can organizations deal with the DBM to perform better? Moreover, how can AI development influence the organization's collective intelligence? Furthermore, how AI deals with mistakes bias? Is the AI the double bias of mistakes or any other bias-free? – remain open.

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