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Optimizing Decision-Making Processes in Times of Covid-19: Using Reflexivity to Counteract Information Processing Failures

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Abstract

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The effectiveness of decision making of governments in times of crisis depends largely on their ability to integrate and make sense of information. Covid-19, for which we currently do not have a cure available, confronts governments with the difficult task of making decisions in the interest of public health and safety. Essentially, governments have to react to a threat, of which the extent is unknown, and they are making decisions in the midst of immense uncertainty. From history we know that biases and errors can distort our thinking process and can lead to negative outcomes. This article proposes that team reflexivity—a deliberate process of discussing team goals, processes, or outcomes—can function as an antidote to biases and errors in decision making during a crisis. Prior research has identified several information-processing failures, such as groupthink, where decisions are made based on a biased sampling of information and the focus is on agreement at all costs. Once a decision is implemented, there is a tendency for biases and errors to be even more pronounced. The tendency is that people with dissenting opinions or who present information that threatens the consensus, are often ignored, whipped into agreement or worse. We highlight team reflexivity as a critical information-processing activity that can improve decision making processes in uncertain times.

Contribution to the field

The Covid-19 crisis currently sweeping the globe has brought about with it many unforeseen difficulties and problems. Policymakers are making decisions about how to respond on the basis on incomplete information, and in the face of time constraints, increasing the chances of faulty decision-making processes with poor outcomes. Prior research has been done on the effect of information-processing failures, and how these can be mitigated through reflexivity, however it has not yet been explored how this can contribute to decision-making during times of crisis. This paper aims to expand on this topic and apply it to group decision-making during the Covid-19 crisis. Groupthink, the phenomenon whereby groups prioritize agreement and harmony over fully exploring options, poses a large threat during this time, as large and diverse groups work to provide solutions. Other information-processing failures, like the framing effect, and escalation of commitment may also bias the way in which information regarding this crisis is handled. Reflexivity is offered as a solution, with a focus on simple practical tools to optimize the decision-making process and maximize the chances of positive outcomes during this crisis.

Ethics statements

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Generated Statement: No animal studies are presented in this manuscript.

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1 # Optimizing Decision-Making Processes in Times of Covid-19: Using
2 # Reflexivity to Counteract Information Processing Failures

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12 **Abstract**

13 The effectiveness of decision making of governments in times of crisis depends largely on their
14 ability to integrate and make sense of information. Covid-19, for which we currently do not have a
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25 consensus, are often ignored, whipped into agreement or worse. We highlight team reflexivity as a
26 critical information-processing activity that can improve decision making processes in uncertain
27 times.

28 **1   Introduction**

29 On January 28th, 1986, people around the world watched in horror, as the Challenger Space Shuttle,
30 due to a catastrophic mechanical failure only minutes after takeoff, disintegrated, killing all 7 crew
31 members onboard (Moorhead et al., 1991). Following an investigation, the official report ruled that
32 the O-rings in the shuttle, which were used to seal up the factory joints, had contained a possibly
33 catastrophic flaw. This information was given to managers before launch (Esser & Lindoerfer, 1989).
34 However, the reports of this flaw had been downplayed and pushed aside, and the issue was never
35 resolved. On the day of the disaster, the shuttle launched in subzero temperatures, despite previous
36 concerns about cold weather potentially increasing the chances of O-ring failures (Moorhead et al.,
37 1991). Many questions were raised following the disaster about how such a risk could be ignored,
38 and the investigation which followed cited a culture within the organization which didn't allow for

39 minority or dissenting opinions to be heard (Heimann, 1993). This situation exhibits a classic
40 example of groupthink, or the tendency for groups to let the desire for harmony or conformity
41 prevail, resulting in dysfunctional decision-making processes (Janis, 1991, Janis & Mann, 1977).

42 Groupthink has long been a topic of study, with researchers attempting to understand when
43 groupthink arises, and in what ways it may undermine a healthy decision-making process (Janis,
44 1991; Turner & Pratkanis, 1998; for reviews see Park, 1990; Whyte, 1989). In the original model,
45 Janis (1991) suggested the effects of groupthink would manifest in failure to consider relevant
46 information and solutions, as well as failures to create contingency plans. The example above showed
47 the dangers of a faulty decision-making process that led to ignoring vital information, and eventually
48 resulted in a tragedy, where lives and equipment were lost (cf. Rosenthal & Kouzmin, 1997). While
49 not all instances of groupthink may result in such dramatic consequences, it remains a serious, and
50 potentially deadly pitfall. And even further risking poor outcomes, prior research has shown that we
51 generally tend to underprepare for disasters (Murata, 2017; Meyer & Kunreuther, 2017).

52 Prior research has shown that distortions in the decision-making process are very common (cf.
53 Schippers et al, 2017). Individuals are inherently bad at making decisions, a problem very easily
54 compounded. Studies have shown that when faced with making decisions in high-stress situations,
55 humans tend towards using decision-making strategies that rely on habit, becoming less willing to
56 alter their course of action once they settle on it (Soares et al., 2012). Prior studies have also shown
57 that time pressures can compound this problem, as high time pressure tends to result in decision
58 makers relying on strategies they've previously used, and not exploring other options fully (Ordóñez
59 & Benson, 1997). These errors and biases are often magnified in larger decision-making groups, and
60 the formation of groups adds the possibility of even more team level biases and errors which can
61 affect decision making processes (Hinsz et al., 1997).

62 Although it may seem far removed from the Challenger Space Shuttle disaster, the covid-19 world
63 crisis may be at risk of the same decision-making errors. Armed with conflicting information, high
64 times pressures, and high stakes, decisions during this crisis are clearly being made under suboptimal
65 conditions. And much like in NASA's case, biases and errors in decision making may lead to highly
66 flawed conclusions, and outcomes endangering the lives of the people involved, which in this case is
67 the entire population. Without a good decision-making process, it may be difficult to achieve positive
68 outcomes. From prior research findings, we know how information processing failures may be
69 avoided, and overcome, and researchers have previously suggested that an effective method for doing
70 so is by fostering a reflexive decision-making process (Schippers et al., 2014). This paper looks at the
71 dangers of information processing failures such as groupthink, during covid-19 decision-making and
72 will offer a solution in the form of group reflexivity – a deliberate process of discussing goals,
73 processes, or outcomes—, as a means of optimizing the process and helping improve the chances of a
74 positive outcome (Schippers et al, 2014, West, 1996).

75 **2   Information Processing Failures During Crisis**

76 Groupthink is only one type of information-processing failure, but there are many others which can
77 occur during decision making. An information-processing failure can be defined as "a distortion in
78 the exchange of, communication about, or elaboration on information due to either an omission error
79 in information sampling or biased elaboration of the information." (Schippers et al., 2014, p 733). In
80 their paper, Schippers et al., also categorized information-processing failures as having three general
81 forms: (1) a failure to share or discuss relevant information, or, (2) if information is shared, a failure
82 to examine implications of shared information, or (3) a failure to update or alter prior conclusions.

83 An overview of the information-processing failures which fall into these categories can be found in
84 Figure 1. The aim of this paper is not to redo the previous review by Schippers et al. (2014), on this
85 topic, but rather the aim is to update and apply it to the covid-19 world crisis. From the perspective of
86 the Covid-19 crisis, it is imperative to consider the errors and biases which fall into each of these
87 three categories, and what effect they may have on the decisions made during this time. More
88 importantly are the development of strategies to avoid these fallacies.

89 ----------------------------------
90 INSERT FIGURE 1 HERE
91 ----------------------------------

92 Groupthink is an information-processing failure in which group decision making is hindered by the
93 collective urge to create harmony, and avoid disagreement (Janis, 1991). The effects of groupthink
94 are that dissenting opinions may go unvoiced or may be pushed aside in favor of keeping the peace
95 and having agreement and harmony within the group (Janis, 1972; Janis, 1982a; Janis, 1982b; Janis
96 & Mann, 1977). A study examining groupthink in organizations created a model suggesting
97 groupthink arises in highly cohesive groups when wishful thinking and reality denial starting at
98 higher levels of the organization, trickle down and become an integrated part of the decision-making
99 process (Bénabou, 2013). Oftentimes, those groups develop a tunnel vision to view the problem, and
100 information not in line with that view is ignored (Janis, 1991). The question is to what extent can we
101 see this happening in the Covid-19 crisis. Although difficult to judge in an ongoing crisis, there have
102 been a lot of questions about government responses to the virus, with people questioning why
103 governments have chosen to ignore certain information, or advice. Most notably, the Chinese
104 government (Kelly, 2020) and the UK government (Pollock et al., 2020) have been widely criticized
105 for their misuse of data and information in responding to this crisis, but the problem may be wider
106 than that. A recent study (Kuhbandner, 2020) suggested that responses to the current crisis are based
107 on a fundamental statistical fallacy about the spread of the disease. Kuhbandner's article suggested
108 that governments were overestimating the rate of disease spread, by not taking into account the effect
109 of increased testing, and how this may account for seemingly rapid increase in the number of cases.
110 His results suggested that when controlling for increased testing, the number of reported new cases
111 had been severely overestimated (Kuhbandner, 2020). Others have noted that the disease has a
112 similar spread, independent of the measures taken by governments to contain the virus (Ben-Israel,
113 2020; Ederer, 2020). These results, and the fact that this avenue has been unexplored by most major
114 governments, suggest a possible fundamental flaw in how information is being processed by
115 policymakers during this time. While presenting a strong, united front in the face of panic is
116 important, if governments aren't considering all options, and allowing for dissenting and conflicting
117 opinions to be brought forward, then the decision-making process is fundamentally flawed, and will
118 be hard pressed to come to the best possible outcome (Hart, 1991).

119 Next to groupthink, a clear risk comes in the form of extensive media and public coverage of the
120 crisis, which has had a distinct focus on the death toll as a result of the virus. Prior research has
121 shown that framing a solution in terms of the number of deaths, lead to different decisions than the
122 when a solution is framed as number of lives saved, even if the outcome is the same (Hameleers,
123 2020). This specific information processing failure, the framing effect, was first demonstrated by
124 Tversky and Kahneman (1981). In their study, Tversky and Kahneman (1981) used the 'Asian
125 Disease Problem', an experimental paradigm used to test how the framing of a problem affected
126 decisions about possible solutions. In this experiment, participants are given a scenario in which they
127 are warned about the outbreak of a dangerous disease, expected to kill 600 people. Subjects then had
128 to decide whether to opt for a risky solution or a certain solution. When participants were presented

129 with the risks framed as the number of lives saved, participants preferred to go for the secure
130 solution. However, when presented with the solution framed as the number of deaths, participants
131 preferred to go for the risky solution. An overview of this paradigm can be seen in Figure 2. This
132 study shows that when outcomes focused on the number of lives lost, participants were likely to opt
133 for solutions which involved larger risks.

134 ----------------------------------
135 INSERT FIGURE 2 HERE
136 ----------------------------------

137 These results might be highly relevant to the current world situation, where decisions about
138 responding to the virus need to be made in the face of an overwhelming public focus on the number
139 of deaths being reported. Recent research suggests that time pressure even further amplifies the
140 framing effects (Diederich, et al., 2018). That is why the death rate statistics, as mentioned in the
141 news every day, constitutes a high-risk strategy in terms of weighing information. And while the
142 effects of the crisis are framed in this way there is a risk that governments will focus on overly risky
143 solutions, potentially overlooking negative side effects of the solution itself (Kühberger, 1998).

144 While a focus on minimizing lives lost is not necessarily a bad approach, it is important to understand
145 that this is not the only negative consequence occurring at this time. Early consideration of the
146 lockdown measures is already showing many unforeseen negative consequences, such as mental
147 health, physical health and safety concerns. For instance, in the UK the lockdown has coincided with
148 domestic violence deaths almost doubling compared to previous years (Grierson, 2020). And
149 researchers are predicting that extreme lockdown measures may result in skyrocketing suicide rates
150 over the coming months (Reger et al., 2020). Additional, initial reports show that patients with other
151 medical conditions are much less likely to receive specialized care during this lockdown, which may
152 have lasting effects on individuals with other (mental) health concerns (Tam et al., 2020;
153 Pfefferbaum & North, 2020). The economic impact of this crisis is also a growing concern. 20
154 million Americans have already filed for unemployment, and initial estimates are suggesting more
155 than 60 million EU jobs could be at risk (Mutikani, 2020; Riley, 2020). However, researchers have
156 warned that containing the virus may not be enough to avoid the economic fallout, and policymakers
157 should be aware of this eventuality (McKibbin & Fernando, 2020). This highlights the fact that in
158 order to make an informed decision, all these consequences need to be weighed up and considered in
159 a decision-making process that doesn't overly focus on a single consequence while ignoring others.
160 A truly reflexive decision-making process highlights the need for the consideration of a wide range of
161 solutions, without the formation of a priori judgements.

162 The Covid-19 crisis is still evolving, with new information continuously being brought to light. In
163 this constantly developing situation, it will be key that groups remain flexible, and are able to
164 evaluate and change their course of action if it becomes necessary. Given the uncertain nature of this
165 situation, it's understandable that decisions made at any given point may no longer be the best
166 decision as the situation continues to change (Tolcott, 1989). As new information becomes available,
167 and more widespread effects of the preventative measures become visible, it's crucial that
168 policymakers are able to reflect on the actions they have taken, and when necessary, make
169 adjustments and changes (cf. Schippers et al, 2014). However, this is more difficult that it seems. A
170 common bias is escalation of commitment, where people keep investing more resources in a set
171 course of action, even in the face of clear evidence that the course of action is not working, or that
172 better options are available (Arkes & Blumer, 1985; Dijkstra & Hong, 2019; for a review see
173 Sleesman et al, 2018). A recent review suggested that an explanation for this phenomenon in groups

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174   lies in the need to publicly stand by and justify their prior decisions, and that this tendency is
175   magnified in diverse groups (Sleesman, 2018; Sleesman et al, 2018). However, prior studies have
176   shown that in order to function effectively, it is key that a group is able to adapt to new information
177   and circumstances, although the difficulty of their goal is often inversely related with their likelihood
178   to effectively do so (LePine, 2005). Reflexive decision making is therefore an ongoing process,
179   where policymakers continuously reassess the situation, and make sure to continue gathering and
180   weighing all newly arising information. And when new information calls for a change in direction,
181   this is a step that policymakers need to be prepared for, and willing to take. Importantly, action
182   should be taken to debias the decision-making process, by means of reflexivity or the use of specific
183   questions to make sure the decision-making process is as bias free as possible (Schippers et al, 2014;
184   Brooks et al., 2020)

185   **3   The Role of Reflexivity in Optimizing Decision-making**

186   Reflexivity is most often studied in the context of group decision making and is most often defined
187   as: "the extent to which group members overtly reflect upon, and communicate about the group's
188   objectives, strategies (e.g., decision making) and processes (e.g., communication), and adapt them to
189   current or anticipated circumstances" (West, 2000, p. 296). Prior research has shown that reflexivity
190   helps improve team performance (Gabelica et al., 2014; Konradt et al., 2015; Lyubovnikova et al.,
191   2017; Otte et al., 2017; Schippers et al., 2013; Yang et al., 2020) and several review articles have
192   examined when and why reflexivity is effective (e.g., Konradt et al., 2016; Otte et al., 2018;
193   Schippers et al., 2014; Schippers et al., 2018; Widmer et al., 2009). A reflexive decision-making
194   process, where all relevant information is taken into account and weighted, will not guarantee an
195   optimal outcome, but it does increase the chance that the quality of the decisions made are better.
196   Thus, it is important to assess how the process leading up to the decisions can be optimized,
197   especially within groups that are vulnerable to information-processing failures, such as those with
198   high task complexity (Schippers et al, 2014).

199   Both the evolution of the disease itself and the long-term economic and mental health impact of this
200   crisis are uncertain. Although some researchers have attempted to predict how events will unfold
201   (KcKibbin & Fernando, 2020), it is still too early to understand what the long-term effects will be.
202   This makes it impossible for policy makers to weigh all the information, because a lot of information
203   is simply not available at this time. However, working with suboptimal information means that more
204   than ever there is a need to optimize the decision-making process with the information that is
205   currently available. Furthermore, reflexivity may offer a method of counteracting incomplete
206   information, by encouraging the pooling and consideration of information scattered across multiple
207   group members (Schulz-Hardt et al., 2006). In a crisis in which considerations come from such a
208   wide range of topics and fields, this is a key factor in fully understanding all aspects. Other studies
209   have shown a wide variety of other factors which are important for fostering reflexivity within
210   decision making teams. These factors include having transformational leadership of the group
211   (Schippers et al., 2008), and fostering psychological safety within the group (Edmondson, 1999).

212   Given the high-pressure nature of the decisions being made during this crisis, it is important to draw
213   awareness to the dangers of groupthink and encourage differing opinions to be brought forth and
214   discussed before decisions go forward (cf. De Dreu, 2007). Reflexivity encourages making the
215   decision-making process an explicit balance of advocacy and inquiry, with a focus on widening the
216   array of opinions considered, and less on decision-making harmony within the group. As an initial
217   practical suggestion, using a checklist to ensure the group is avoiding groupthink may offer a simple
218   solution to navigate around the potentially dangerous groupthink pitfall. In his early work on

219 groupthink Janis (1991) offers an overview of observable consequences of groupthink, which forms a
220 useful basis for symptoms to be aware of, check for, and avoid.

221 An additional tool to help increase bias free, reflexive decision making is the 'Five Whys' technique.
222 This technique, based on stopping and asking why five times when analyzing a problem, aims to
223 create a more mindful, complete understanding of the chain between cause and effect (Serrat, 2017).
224 In Figure 1, we list several biases described here and in Schippers et al (2014) and several ways to
225 debias the decision-making process. During this crisis large decision-making groups need to make
226 sure they do not get caught up in treating the surface level symptoms of the crisis, while overlooking
227 the underlying causes.

228 **4   Conclusion**

229 This paper has aimed to update the findings of Schippers et al. (2014), by adding to and applying the
230 understanding of information-processing failures to decision-making during the current world crisis.
231 The risk of biases and errors in decision-making has the potential to cause widespread damages, and
232 it is of vital importance that policymakers take steps to minimize these effects. Overall, increasing
233 group reflexivity may offer the key to helping teams optimize their decision making by minimizing
234 the occurrence and effect of information-processing errors. Although the crisis is already in full
235 swing, and biases may have already had an impact on decisions made, implementing a reflexive
236 decision-making process could help policymakers go forward, and allow them to maximize the
237 chances of good outcomes going forward.

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248 **References**

249 Arkes, H. R., & Blumer, C. (1985). The psychology of sunk cost. *Organizational Behavior and*
250   *Human Decision Processes*, *35*(1), 124–140. https://doi.org/10.1016/0749-5978(85)90049-4

251 Ben-Israel, I. (2020). The end of exponential growth: The decline in the spread of coronavirus. *Times*
252   *of Israel*. https://www.timesofisrael.com/the-end-of-exponential-growth-the-decline-in-the-
253   spread-of-coronavirus/

254 Bénabou, R. (2013). Groupthink: Collective Delusions in Organizations and Markets. *Review of*
255   *Economic Studies*, *80*, 429–462. https://doi.org/10.1093/restud/rds030

256 Brooks, B., Curnin, S., Owen, C., & Bearman, C. (2020). Managing cognitive biases during disaster
257   response: the development of an aide memoire. *Cognition, Technology & Work*, *22*, 249–261.
258   https://doi.org/10.1007/s10111-019-00564-5

259 De Dreu, C. K. W. (2007). Cooperative outcome interdependence, task reflexivity, and team
260   effectiveness: A motivated information processing perspective. *Journal of Applied Psychology*,
261   *92*(3), 628–638. https://doi.org/10.1037/0021-9010.92.3.628

262 Diederich, A., Wyszynski, M., & Ritov, I. (2018). Moderators of framing effects in variations of the
263   Asian Disease problem: Time constraint, need, and disease type. *Judgment and Decision*
264   *Making*, *13*(6), 529–546.

265 Dijkstra, K. A., & Hong, Y. yi. (2019). The feeling of throwing good money after bad: The role of
266   affective reaction in the sunk-cost fallacy. *PLoS ONE*, *14*(1).
267   https://doi.org/10.1371/journal.pone.0209900

268 Ederer, P. (2020). *Der Lockdown ist nahezu wirkungslos – eine Beweisschrift*. Achgut.Com.
269   https://www.achgut.com/artikel/der_lockdown_ist_nahezu_wirkungslos_eine_beweisschrift

270 Edmondson, A. (1999). Psychological Safety and Learning Behavior in Work Teams. In *Source:*
271   *Administrative Science Quarterly* (Vol. 44, Issue 2).

272 Esser, J. K., & Lindoerfer, J. S. (1989). Groupthink and the space shuttle challenger accident:
273   Toward a quantitative case analysis. *Journal of Behavioral Decision Making*, *2*(3), 167–177.
274   https://doi.org/10.1002/bdm.3960020304

275 Gabelica, C., Van den Bossche, P., De Maeyer, S., Segers, M., & Gijselaers, W. (2014). The effect of
276   team feedback and guided reflexivity on team performance change. *Learning and Instruction*,
277   *34*, 86–96. https://doi.org/10.1016/j.learninstruc.2014.09.001

278 Grierson, J. (2020, April 15). *Domestic abuse killings "more than double" amid Covid-19 lockdown*.
279   The Guardian. https://www.theguardian.com/society/2020/apr/15/domestic-abuse-killings-more-
280   than-double-amid-covid-19-lockdown

281   Hameleers, M. (2020). *Prospect Theory in Times of a Pandemic: The Effects of Gain versus Loss*
282   *Framing on Policy Preferences and Emotional Responses During the 2020 Coronavirus*
283   *Outbreak*. https://osf.io/preprints/socarxiv/7pykj/

284   Hart, P. (1991). Groupthink, risk-taking and recklessness: Quality of process and outcome in policy
285   decision making. *Politics & the Individual*, *1*(1).

286   Heimann, C. F. L. (1993). Understanding the Challenger Disaster: Organizational Structure and the
287   Design of Reliable Systems . *American Political Science Review*, *87*(2), 421–435.
288   https://doi.org/10.2307/2939051

289   Hinsz, V. B., Tindale, R. S., & Vollrath, D. A. (1997). The emerging conceptualization of groups as
290   information processors. *Psychological Bulletin, 121*, 43-64. doi:10.1037//0033-2909.121.1.43

291   Janis, I. L. (1972). *Groupthink: Psychological studies of policy fiascoes.* (2 ed.). Boston, MA:
292   Houghton-Mifflin.

293   Janis, I. L. (1982a). *Groupthink: Psychological studies of policy decisions and fiascoes.* Boston, MA:
294   Houghton Mifflin.

295   Janis, I. L. (1982b). *Victims of Groupthink* (2 ed.). Boston, MA: Houghton-Mifflin.

296   Janis, I. (1991). Groupthink of Irving Janis. In E. Griffin (Ed.), *A First Look at Communication*
297   *Theory* (pp. 235–246). McGrawHill.

298   Janis, I. L., & Mann, L. (1977). *Decision Making: A Psychological Analysis of Conflict, Choice, and*
299   *Commitment* (Issue 1). The Free Press. https://doi.org/10.1177/000271628044900155

300   Kelly, É. (2020). *China was slammed for initial COVID-19 secrecy, but its scientists led the way in*
301   *tackling the virus*. Science Business. https://sciencebusiness.net/international-news/china-was-
302   slammed-initial-covid-19-secrecy-its-scientists-led-way-tackling-virus

303   Konradt, U., Otte, K. P., Schippers, M. C., & Steenfatt, C. (2016). Reflexivity in teams: A review and
304   new perspectives. In *Journal of Psychology: Interdisciplinary and Applied* (Vol. 150, Issue 2,
305   pp. 151–172). Routledge. https://doi.org/10.1080/00223980.2015.1050977

306   Konradt, U., Schippers, M. C., Garbers, Y., & Steenfatt, C. (2015). Effects of guided reflexivity and
307   team feedback on team performance improvement: The role of team regulatory processes and
308   cognitive emergent states. *European Journal of Work and Organizational Psychology*, *24*(5),
309   777–795. https://doi.org/10.1080/1359432X.2015.1005608

310   Kuhbandner, C. (2020). *The Scenario of a Pandemic Spread of the Coronavirus SARS-CoV-2 is*
311   *Based on a Statistical Fallacy*. https://doi.org/10.31124/ADVANCE.12151962.V1

312   Kühberger, A. (1998). The Influence of Framing on Risky Decisions: A Meta-analysis.
313   *Organizational Behavior and Human Decision Processes*, *75*(1), 23–55.
314   https://doi.org/10.1006/obhd.1998.2781

315   LePine, J. A. (2005). Adaptation of teams in response to unforeseen change: Effects of goal difficulty
316   and team composition in terms of cognitive ability and goal orientation. In *Journal of Applied*
317   *Psychology* (Vol. 90, Issue 6, pp. 1153–1167). https://doi.org/10.1037/0021-9010.90.6.1153

318   Lyubovnikova, J., Legood, A., Turner, N., & Mamakouka, A. (2017). How Authentic Leadership
319   Influences Team Performance: The Mediating Role of Team Reflexivity. *Journal of Business*
320   *Ethics*, *141*(1), 59–70. https://doi.org/10.1007/s10551-015-2692-3

321   McKibbin, W. J., & Fernando, R. (2020). The Global Macroeconomic Impacts of COVID-19: Seven
322   Scenarios. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3547729

323   Meyer, R., & Kunreuther, H. (2017). *The Ostrich Paradox: Why We Underprepare for Disasters.*
324   Wharton Digital Press.

325   Moorhead, G., Ference, R., & Neck, C. P. (1991). Group Decision Fiascoes Continue: Space Shuttle
326   Challenger and a Revised Groupthink Framework. *Human Relations*, *44*(6).

327   Murata, A. (2017). Cultural Difference and Cognitive Biases as a Trigger of Critical Crashes or
328   Disasters. *Journal of Behavioral and Brain Science,* 07(09), 399–415.
329   https://doi.org/10.4236/jbbs.2017.79029

330   Mutikani, L. (2020). *COVID-19: This is the impact on employment and jobs in the US*. World
331   Economic Forum. https://www.weforum.org/agenda/2020/04/united-states-unemployment-
332   claimants-coronavirus-covid19/

333   Ordóñez, L., & Benson, L. (1997). Decisions under time pressure: How time constraint affects risky
334   decision making. *Organizational Behavior and Human Decision Processes*, *71*(2), 121–140.
335   https://doi.org/10.1006/obhd.1997.2717

336   Otte, K. P., Konradt, U., Garbers, Y., & Schippers, M. C. (2017). Development and validation of the
337   REMINT: a reflection measure for individuals and teams. *European Journal of Work and*
338   *Organizational Psychology*, *26*(2), 299–313. https://doi.org/10.1080/1359432X.2016.1261826

339   Otte, K.-P., Knipfer, K., & Schippers, M. (2018). *Team Reflection: A Catalyst of Team Development*
340   *and the Attainment of Expertise*. https://doi.org/10.1093/OXFORDHB/9780198795872.013.44

341   Park, W.W. (1990). A Review of research on Groupthink. *Journal of Behavioral Decision Making*,
342   *3*(4), 229–245. https://doi.org/10.1002/bdm.3960030402

343   Pfefferbaum, B., & North, C. S. (2020). Mental Health and the Covid-19 Pandemic. *New England*
344   *Journal of Medicine*. https://doi.org/10.1056/nejmp2008017

345   Pollock, A. M., Roderick, P., Cheng, K. K., & Pankhania, B. (2020). Covid-19: Why is the UK
346   government ignoring WHO's advice? In *The BMJ* (Vol. 368). BMJ Publishing Group.
347   https://doi.org/10.1136/bmj.m1284

348   Reger, M. A., Stanley, I. H., & Joiner, T. E. (2020). Suicide Mortality and Coronavirus Disease
349   2019—A Perfect Storm? *JAMA Psychiatry*. https://doi.org/10.1001/jamapsychiatry.2020.1060

350   Riley, C. (2020). *60 million European jobs are at risk from coronavirus*. CNN Business.
351   https://edition.cnn.com/2020/04/19/business/europe-jobs-coronavirus-mckinsey/index.html

352   Rosenthal, U., & Kouzmin, A. (1997). Crises and Crisis Management: Toward Comprehensive
353   Government Decision Making. *Journal of Public Administration Research and Theory*, *7*(2),
354   277–304. https://doi.org/10.1093/oxfordjournals.jpart.a024349

355   Schippers, M. C., Den Hartog, D. N., Koopman, P. L., & van Knippenberg, D. (2008). The role of
356   transformational leadership in enhancing team reflexivity. *Human Relations*, *61*(11), 1593–
357   1616. https://doi.org/10.1177/0018726708096639

358   Schippers, M. C., Edmondson, A. C., & West, M. A. (2014). Team Reflexivity as an Antidote to
359   Team Information-Processing Failures. *Small Group Research*, *45*(6), 731–769.
360   https://doi.org/10.1177/1046496414553473

361   Schippers, M. C., Edmondson, A. C., & West, M. A. (2018). *Team Reflexivity*.
362   https://doi.org/10.1093/OXFORDHB/9780190263362.013.39

363   Schippers, M. C., Homan, A. C., & van Knippenberg, D. (2013). To reflect or not to reflect: Prior
364   team performance as a boundary condition of the effects of reflexivity on learning and final
365   team performance. *Journal of Organizational Behavior*, *34*(1), 6–23.
366   https://doi.org/10.1002/job.1784

367   Schulz-Hardt, S., Brodbeck, F. C., Mojzisch, A., Kerschreiter, R., & Frey, D. (2006). Group decision
368   making in hidden profile situations: Dissent as a facilitator for decision quality. *Journal of
369   Personality and Social Psychology*, *91*(6), 1080–1093. https://doi.org/10.1037/0022-
370   3514.91.6.1080

371   Serrat, O. (2017). The Five Whys Technique. In *Knowledge Solutions* (pp. 307–310). Springer.
372   https://doi.org/10.1007/978-981-10-0983-9_32

373   Sleesman, D. J., Lennard, A. C., McNamara, G., & Conlon, D. E. (2018). Putting Escalation of
374   Commitment in Context: A Multilevel Review and Analysis. *Academy of Management Annals*,
375   *12*(1), 178–207. https://doi.org/10.5465/annals.2016.0046

376   Soares, J. M., Sampaio, A., Ferreira, L. M., Santos, N. C., Marques, F., Palha, J. A., Cerqueira, J. J.,
377   & Sousa, N. (2012). Stress-induced changes in human decision-making are reversible.
378   *Translational Psychiatry*, *2*(7), e131–e131. https://doi.org/10.1038/tp.2012.59

379   Tam, C. C. F., Cheung, K. S., Lam, S., Wong, A., Yung, A., Sze, M., Lam, Y. M., Chan, C., Tsang,
380   T. C., Tsui, M., Tse, H. F., & Siu, C. W. (2020). Impact of Coronavirus Disease 2019 (COVID-
381   19) Outbreak on ST-Segment-Elevation Myocardial Infarction Care in Hong Kong, China. In
382   *Circulation. Cardiovascular quality and outcomes*. NLM (Medline).
383   https://doi.org/10.1161/CIRCOUTCOMES.120.006631

384   Tolcott, M. A., Marvin, F. F., & Lehner, P. E. (1989). Expert Decision making in Evolving
385   Situations. *IEEE Transactions on Systems, Man and Cybernetics*, *19*(3), 606–615.
386   https://doi.org/10.1109/21.31066

387   Turner, M. E., & Pratkanis, A. R. (1998). Twenty-five years of groupthink theory and research:
388   Lessons from the evaluation of a theory. *Organizational Behavior and Human Decision*
389   *Processes*, *73*(2–3), 105–115. https://doi.org/10.1006/obhd.1998.2756

390   Tversky, A., & Kahneman, D. (1981). *The Framing of Decisions and the Psychology of Choice*.
391   www.sciencemag.org

392   West, M. A. (1996). Reflexivity and work group effectiveness: A conceptual integration. In M. A.
393   West (Ed.), *Handbook of work group psychology* (pp. 555-579). Chichester, UK: John Wiley.

394   West, M. A. (2000). Reflexivity, revolution and innovation in work teams. In M. M. Beyerlein, D. A.
395   Johnson, & S. T. Beyerlein (Eds.), Product development teams (Vol. 5): 1-29. Stamford, CT:
396   JAI Press.

397   Whyte, G. (1989). Groupthink Reconsidered. *Academy of Management Review*, *14*(1), 40–56.
398   https://doi.org/10.5465/amr.1989.4279001

399   Widmer, P., Schippers, M., & West, M. (2009). Recent developments in reflexivity research: A
400   review. *Psychology of Everyday Activity*, *2*(2), 2–11. http://eprints.lancs.ac.uk/53195/

401   Yang, M., Schloemer, H., Zhu, Z., Lin, Y., Chen, W., & Dong, N. (2020). Why and When Team
402   Reflexivity Contributes to Team Performance: A Moderated Mediation Model. *Frontiers in*
403   *Psychology*, *10*, 3044. https://doi.org/10.3389/fpsyg.2019.03044

Figure 1.JPEG

Information-processing failures/ areas of reflection		**Examples**	**Remedies fostering reflexivity**
	SEARCHING/ SHARING/	*Failure to search for and share information* - Common knowledge effect - Hidden profile effect - Motivated information sharing	*Assuring useful, relevant and correct information* - Giving the group more time to discuss - Access to informational records during discussion - Instructing members not to form a priori judgments - Framing the task as a problem to be solved - Assigning roles associated with the information distribution - Having a norm to reflect
	ELABORATION /ANALYZING	*Failure to elaborate on and analyze information* - Framing - Heuristics - Positive illusions	*Explicit information processing* - Grounded in data - Offered as disconfirmable statements - Balance advocacy and inquiry
	REVISING/ UPDATING	*Failure to revise and update conclusions* - Groupthink - Social entrainment - Escalation of commitment - Confirmation bias	*Explicit attention to the team's decision-making process, and potential disconfirming information* - Interruptions - Time-out - Process accountability

Figure 2.JPEG

Framing: Lives Saved

Option 1 (certain): 200 people live

Option 2 (risky): 33% chance 600 people are saved, 66% chance nobody is saved

Framing: Lives Lost

Option 1 (certain): 400 people die

Option 2 (risky): 33% chance nobody dies, 66% chance 600 people die