

1 **Decision-Making Processes in Times of Covid-19: Using Reflexivity to** 2 **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. The Covid-19 crisis confronts governments with
15 the difficult task of making decisions in the interest of public health and safety. Essentially,
16 governments have to react to a threat, of which the extent is unknown, and they are making decisions
17 in the midst of immense uncertainty. The issues involved are highly complex, and governments have
18 to trade-off several interests, including (mental) health, economy, and personal rights. Two errors
19 seem likely: either acting too strongly or acting not strongly enough. A third error is not updating the
20 policies in light of new information. Importantly, the handling of the current crisis has been criticized
21 for lacking a scientific basis. As early on, modelers predicted that the public health threat was
22 comparable to that of the Spanish flu, governments made harsh decisions concerning suppressive
23 measures such as lockdowns. Prior research has identified several information-processing failures,
24 that can distort our thinking processes and can lead to negative outcomes. Revising and updating
25 conclusions and policies in the light of new information is something decision makers have difficulty
26 in doing. Two failures I also highlight are: the failure to search for and share information that is not
27 in line with earlier information, and the failure to elaborate on and analyze information, especially
28 information that diverges from original held ideas and conclusions. In the current crisis, it has
29 become clear that especially forecasting has been an issue and seems to have failed. These failed
30 predictions have been taken as a starting point for many decisions, such as draconian lockdowns and
31 the consequences are quite severe in terms of economic, (mental) health and societal costs. This
32 paper aims to offer practical advice to decision-making groups as to what information-processing
33 failures may be most likely to occur, based on prior research, in the context of the current situation.
34 Specifically, the current article proposes that team reflexivity—a deliberate process of discussing
35 team goals, processes, or outcomes—can function as an antidote to biases and errors in decision
36 making during a crisis. Prior research has identified several information-processing failures, such as
37 groupthink, where decisions are made based on a biased sampling of information and the focus is on
38 agreement at all costs. The circumstances surrounding the Covid-19 crisis may make the decision-
39 making process more vulnerable to these failures (eg., Joffe, 2020). Thus, an important aim of this
40 article is to explore which information-processing failures might play a role during the Covid-19

41 crisis. I highlight team reflexivity as a critical information-processing activity that can improve
42 decision making processes in uncertain times.

43 *“Be open to adjustments. There's nothing about this current moment in history*
44 *that allows for stubbornness.”*

45 ~ Unknown

46

47 **1 Introduction**

48 The Covid-19 crisis has had a large impact on the international landscape in 2020. Few, if any,
49 countries have been left untouched by the crisis, and world governments have spent months trying to
50 respond to the crisis and decide how best to proceed. Governments around the world were and are
51 aiming to avoid overwhelming “critical care capacity”, realizing that this has negative economic,
52 social health and educational consequences (Kissler, Tedijanto, Goldstein, et al., 2020; for a review
53 see Kissler, Tedijanto, Lipsitch, et al., 2020). Early estimates stated that 7.0 billion infections and 40
54 million deaths could arise (Walker et al., 2020), and estimates of case fatality rates ranged from .17 to
55 as high a 20% (the latter was claimed in an article of (Baud et al., 2020), for a review see (Caduff,
56 2020), and that the spread would be exponential (Banerjee et al., 2020). Based on these estimates,
57 many governments decided on strict lockdowns and measures. In their effort to slow the virus, a war
58 analogy was used, whereby people were expected to behave in accordance to the measures (“for the
59 greater good”), and people questioning the measures or not adhering to them were even seen as
60 traitors (Joffe, 2020). This seemed to be associated with a lot of collateral damage, that had to be
61 taken for granted, while calls for rethinking the policies seemed to be suppressed and this may have
62 left early assumptions unquestioned. Fear-based references to the magnitude of the threat were used
63 to justify a “one size fits all” approach (Caduff, 2020). This led to a policy focused on slowing the
64 spread of the virus, and a relative disregard of the side and ripple effects in the society at large. A
65 recent review paper noted that, measures taken to slow the spread of the virus have harmful
66 consequences for non-Covid related public health and the economy (Schippers, 2020). Even early on
67 in the crisis, it was estimated that millions of workers worldwide could be affected, and more than
68 100 million people could face starvation as economies are hit and supply chains are interrupted
69 (Inman, 2020; Zetzsche & Consiglio, 2020). Moreover, the postponement or cancellations of millions
70 of medical treatments could have long-term consequences for the general population (Heath, 2020).
71 Recent reviews have concluded that the measures taken to mitigate the current crisis may have done
72 more harm than good, with little evidence for most of the aggressive measures to actually reduce the
73 death toll. Ioannidis et al (2020, p. 7) even concluded that: “Civilization is threatened by epidemic
74 incidentalomas”. At the same time, decision-making during this critical time may be even more
75 difficult than expected as the situation continuously changes and develops. Armed with conflicting
76 information, time pressure, and high stakes, decisions during this crisis are clearly being made under
77 suboptimal conditions (Otte et al., 2017, 2018; Rastegary & Landy, 1993; cf. Schippers et al., 2007,
78 2015, 2017, 2018). Making decisions under these circumstances is likely to increase the chances of a
79 flawed decision-making process, as a result of information processing failures (Halpern et al., 2020;
80 Hammond, 1996). For instance, it seems that early predictions on infection fatality rates (e.g.,
81 Ferguson et al., 2020), that are now known to be far too high, have hardly led to an update in policies
82 for most countries. The actual inferred infection fatality rates seem to be much lower than early
83 estimates, even for countries that had light or no lockdowns (Ioannidis et al., 2020; Jefferson &
84 Heneghan, 2020). As a case in point, while the early prediction for California was that at least 1.2

85 million people over the age of 18 would need a hospital bed, and that 50,000 additional hospital beds
86 were needed, at the height of the infection well under 5 percent of hospital beds were occupied by
87 Covid-19 patients (Ioannidis et al., 2020). In the end, very few hospitals were overwhelmed, and if
88 they were, this was only for a short period of time. Currently, it becomes clear that also modeling for
89 the resurgence of the virus (second wave) also failed (Ioannidis et al., 2020). Other authors argue that
90 the lockdowns were too late or too loose to be effective (Chaudhry et al., 2020), which would also
91 represent an information processing failure. These articles imply that early intervention is key
92 (Dergiades et al., 2020). Importantly, a more holistic approach taking all possible benefits and
93 negative effects into account should guide decision making in this crisis (Ioannidis et al., 2020).
94 Prior research has shown that distortions and failures in the decision-making process are quite
95 common (Schippers et al., 2014). In fact, research in large companies has shown that nearly 50% of
96 decisions fail, and one of the reasons for this is a flawed decision-making process (Nutt, 1999).
97 Studies have shown that when faced with making decisions in high-stress situations, humans tend to
98 rely on habit, and use decision-making strategies they are most familiar with (Soares et al., 2012), a
99 problem compounded by high time pressure (Ordóñez & Benson, 1997). Another reason may be that
100 decision makers engage in motivated information processing, and make conscious decisions
101 regarding what information they will elaborate on (de Dreu et al., 2008). While these errors may
102 occur at the individual level, they are often magnified in larger decision-making groups, alongside
103 the addition of team level biases and errors which can affect decision making processes (Hinsz et al.,
104 1997). Understanding and avoiding errors, especially erring on the side of too harsh or too lenient
105 measures during this period of time is extremely important.

106 At the same time, given the fact that information about ongoing government decision-making
107 processes are not readily available, there is limited direct evidence of these failures at this point in
108 time. Although more and more information becomes available, we would need more information on
109 these decisions, to allow a more in-depth assessment of the specific decision-making processes. At
110 this point, the main focus is to point out where and how these failures may be most likely to occur,
111 and to make suggestions for the current situation on the basis of prior research. Furthermore, while
112 the Covid-19 crisis is ongoing, it is difficult to assess the exact long-term consequences of the
113 decisions being made. Governments will have to trade-off different short-term and long-term
114 interests, which highlights the need for an improved decision-making process. While it may not be
115 possible to determine which decisions are best, it is possible to improve the processes being used to
116 come to those decisions, and thus increase the chances of good outcomes (Hart, 1991). Prior research
117 has shown that having a good decision-making process is an important prerequisite and increases the
118 likelihood of positive outcomes (Bloodgood, 2011; Nutt, 1999; Wolak, 2013), which is very
119 important during a high stakes period like a pandemic. Previous research has shown that many
120 factors can influence the government level decision-making process (Beal, 2020; Mercer, 2020).

121 As previously stated, information processing errors are very common, especially in large decision-
122 making groups operating under suboptimal conditions, and this increases the risks of these errors
123 occurring as governments try to respond to the crisis. While some of the decisions may be the result
124 of motivated information processing (de Dreu, 2007), in the current paper I focus on biases and errors
125 that result from information processing failures (Schippers et al., 2014). Therefore, it is important to
126 understand which information-processing errors may be likely to occur during this crisis, and in what
127 ways, based on prior research, they can be avoided.

128 From prior research, we know that information processing failures can be avoided and overcome, and
129 researchers have previously suggested that an effective method for doing so is by fostering a
130 reflexive decision-making process (Schippers et al., 2014). Reflexivity is most often studied in the

131 context of group decision making and is most often defined as: “the extent to which group members
 132 overtly reflect upon, and communicate about the group’s objectives, strategies (e.g., decision making)
 133 and processes (e.g., communication), and adapt them to current or anticipated circumstances” (West,
 134 2000, p. 296). Prior research has shown that reflexivity helps improve team performance (Gabelica
 135 et al., 2014; Konradt et al., 2016; Lyubovnikova et al., 2017; Otte et al., 2017; Schippers et al., 2013;
 136 Yang et al., 2020) and several review articles have examined when and why reflexivity is effective
 137 (e.g., Konradt et al., 2016; Otte et al., 2018; Schippers et al., 2014, 2018; Widmer et al., 2009). A
 138 reflexive decision-making process, where all relevant information is taken into account and weighted,
 139 will not guarantee a positive outcome, but it does improve the process, thus increasing the chances
 140 that the quality of the decisions made are better. Thus, it is important to assess how the process
 141 leading up to the decisions can be improved, especially within groups that are vulnerable to
 142 information-processing failures, such as those with high task complexity (Schippers et al., 2014).
 143 While not all instances of information-processing failures result in major consequences, it remains a
 144 serious and potentially deadly pitfall during the current crisis (Schippers, 2020). And even further
 145 risking poor outcomes, prior research has shown that we have a tendency to underprepare for
 146 disasters (Meyer & Kunreuther, 2017; Murata, 2017). It is therefore key to realize that good decision-
 147 making processes enhance the chances of high-quality decisions and decision outcomes, and thus in
 148 the current paper I focus on enhancing the decision-making process. This paper builds on prior work
 149 by Schippers et al., (2014) by looking at information-processing failures, and how they may occur
 150 during the Covid-19 crisis. The aim of this paper is to understand the different types of information
 151 processing failures and the dangers they pose during the pandemic. Furthermore, I aim to outline how
 152 increased reflexivity in decision-making groups may help to avoid some of these failures, and
 153 improve the decision-making process, thus improving the chances of positive outcomes.

154 **2 Information Processing Failures During Crisis**

155 There are different kinds of information-processing errors which can occur, especially in complicated
 156 situations like the world currently finds itself in. An information-processing failure can be defined as
 157 “a distortion in the exchange of, communication about, or elaboration on information due to either an
 158 omission error in information sampling or biased elaboration of the information.” (Schippers et al.,
 159 2014, p. 733). While individuals do differ in terms of decision-making competence (Bruine De Bruin
 160 et al., 2007), our focus is on the group level decision making process. Schippers et al. (2014),
 161 categorized group information-processing failures as having three general forms: (1) a failure to share
 162 or discuss relevant information, (2) if information is shared, a failure to examine implications of
 163 shared information, and (3) a failure to update or alter prior conclusions. An overview of the
 164 information-processing failures which fall into these categories can be found in Figure 1. In this
 165 figure, I have listed some examples of common pitfalls that will likely play a role during current
 166 decision making. I describe some examples of these pitfalls briefly and also propose ways to solve
 167 these issues. The main aim of this paper is to renew and update a previous review by Schippers et al.,
 168 (2014) on this topic and apply it to the Covid-19 world crisis, to be able to offer practical advice to
 169 counteract any potential information-processing failures which may occur. From the perspective of
 170 the Covid-19 crisis, it is imperative to consider the errors and biases which fall into each of these
 171 three categories, and what effect they may have on the decisions made during this time. More
 172 importantly are the development of strategies to avoid these failures and increase the chances of
 173 positive outcomes as the crisis goes forward.

174 -----
 175 INSERT FIGURE 1 HERE
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177 2.1 Failure to Search for and Share Information

178 The first kind of information-processing error which could affect decision making during this crisis
 179 involves the failure to search for and share information. This is especially relevant in situations where
 180 complex decisions need to be made, with input from multiple sources (Schippers et al., 2014). This is
 181 very much the case during Covid-19, where policy decisions are being made with input from multiple
 182 fields to try and maximize the information considered (Holmes et al., 2020; Romei et al., 2020). One
 183 problem faced during the current crisis is that in order to counteract the spread of misinformation,
 184 many tech platforms have been forced to rush in and remove potentially dangerous “fake news” and
 185 false information (Abrusci, 2020). At the same time, the Covid-19 crisis has exacerbated existing
 186 human rights violations in many countries, and enabled others (Fisman et al., 2020; Saunders, 2020).
 187 Important problems have been the reluctance to admit uncertainties in data, as well as the lack of
 188 access and transparency in data (Heneghan & Jefferson, 2020; Jefferson & Heneghan, 2020). In
 189 general, there are many pitfalls which ideally should be avoided when working in large,
 190 multidisciplinary teams. Prior research has shown that teams tend to focus on common information,
 191 minimizing discussion about unique opinions, or information (Larson et al., 1996). Furthermore,
 192 team members often avoid or hesitate to share information that could cause disagreement and disturb
 193 the harmony within the team (Janis, 1991). This phenomenon is known as groupthink and has been
 194 extensively explored as a common pitfall in group decision making (Janis, 1982; Janis & Mann,
 195 1977). According to researchers, groupthink often occurs when wishful thinking and reality denial
 196 start at higher levels of the organization and trickle down to become an integrated part of the
 197 decision-making process at all levels (Bénabou, 2013). Furthermore, structural and procedural faults
 198 of the organization are regularly related to groupthink (Tetlock et al., 1992). Oftentimes, those groups
 199 develop tunnel vision to view the problem, and information not in line with that view is ignored
 200 (Janis, 1991). It has been suggested that international government’s refusal to heed the warnings of
 201 the scientific community and plan for a potential deadly viral outbreak before the Covid-19 crisis was
 202 a result of widespread groupthink (Horton, 2020). Some researchers have also suggested there has
 203 been little attention paid to the side effects of the preventative measures already taken, and have
 204 raised the question about the extent to which some countries measures are evidence-based and
 205 proportional (Ioannidis et al., 2020; Joffe, 2020; Schippers, 2020). A recent article by Timotijevic
 206 (2020) suggested that silencing dissenting opinions is a historically common government response to
 207 pandemic situations, in order to steer public narrative and bolster support for government actions. An
 208 article by John Ioannidis has pointed out that some countries adopted measures in response to the
 209 virus of unknown effectiveness, without full knowledge of what the wider side-effects would be
 210 (Ioannidis, 2020). According to him: “Proper communication and optimal decision-making are an
 211 ongoing challenge, as data evolve. The challenge is compounded, however, by exaggerated
 212 information. This can lead to inappropriate actions. It is important to differentiate promptly the true
 213 epidemic from an epidemic of false claims and potentially harmful actions” (Ioannidis, 2020, p. 1) .
 214 In a paper as early as March 2020, Ioannidis already pointed out several important information
 215 processing failures and pointed out that that non-evidence-based measures were quite harmful
 216 (Ioannidis, 2020). Specific problems he addressed are: fake news and withdrawn papers, exaggerated
 217 pandemic estimates, case fatality rates, and exponential community spread, extreme, non-evidence
 218 based measures, causing widespread economic and social disruption (see also Caduff, 2020). At the
 219 same time, his own predictions were also criticized (Andrew, 2020) and it was concluded that: “point
 220 forecasts are close to useless, and distributional forecasts are really hard. We have to try our best and
 221 use all available resources.” While the Covid-19 situation is still unfolding, it’s difficult to judge
 222 whether these flaws are present in individual government’s decision-making processes. However,
 223 prior research has shown that these errors have occurred during decision-making in previous high-
 224 stress situations and are likely to occur again during the current similarly high-stress crisis (Sterman,

225 2006; Timotijevic, 2020). While presenting a strong, united front in the face of possible panic is
 226 important, if a government isn't considering all options, and allowing for dissenting and conflicting
 227 opinions to be brought forward, then the decision-making process can become flawed, and could
 228 negatively affect the chances of achieving positive outcomes (Hart, 1991). Ioannidis et al (2020, table
 229 3) list several potential reasons why forecasting and information processing has failed, including poor
 230 data input, wrong assumptions, poor past evidence on effects of interventions, lack of transparency in
 231 modeling, focus on a few dimensions or outcomes, groupthink, and selective reporting of forecasts.

232 Even so, at this point in time, both the evolution of the disease itself and the long-term economic and
 233 mental health impact of this crisis are not fully known. Although some researchers have attempted to
 234 predict how events will unfold (McKibbin & Fernando, 2020), it is still too early to understand what
 235 the long-term effects will be. At the same time, it has become clear that there are many secondary
 236 side effects already playing out, and this has given rise to the question of whether the cure is worse
 237 than the disease (Schippers, 2020). Reflexivity offers a method of counteracting incomplete
 238 information, by encouraging the pooling and consideration of information scattered across multiple
 239 group members (Schulz-Hardt et al., 2006). In a crisis in which considerations come from such a
 240 wide range of topics and fields, this is a key factor in fully understanding all aspects. Other studies
 241 have shown a wide variety of other factors which are important for fostering reflexivity within
 242 decision making teams. These factors include having transformational leadership of the group
 243 (Schippers et al., 2008), and fostering psychological safety within the group (Edmondson, 1999).
 244 Reflexivity encourages making the decision-making process an explicit balance of advocacy and
 245 inquiry, with a focus on widening the array of opinions considered, and less on decision-making
 246 harmony within the group. As a practical suggestion, using a checklist to ensure the decision-making
 247 group is avoiding groupthink may offer a simple solution to navigate around the potentially
 248 dangerous groupthink pitfall. In his early work on groupthink Janis (1991) offers an overview of
 249 observable consequences of groupthink. This forms a useful basis for creating a checklist to screen
 250 for symptoms of groupthink to be aware of, check for, and avoid. Table 1 offers an overview items
 251 that could be used in a checklist to ensure groupthink is being minimized. Furthermore, encouraging
 252 the discussion of unique, or dissenting opinions is also important, as it protects against the pitfall of
 253 groupthink, and the potential dangers which accompany it (cf. Emmerling & Rooders, 2020)

254 -----
 255 INSERT TABLE 1 HERE
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257 **2.2 Failure to Elaborate on and Analyze Information**

258 Even once (reliable and high-quality) information has been gathered, information processing failures
 259 can occur during the process of analyzing and elaborating on that information. During the Covid-19
 260 crisis, a clear risk comes in the form of the framing effect, which results from extensive media and
 261 public coverage of the crisis, with a distinct focus on the death toll as a direct result of the virus (cf.
 262 Ogbodo et al., 2020; Schippers, 2020). Prior research has shown that framing a solution in terms of
 263 the number of deaths, leads to different decisions than when a solution is framed as number of lives
 264 saved, even if the outcome is the same (Hameleers, 2020). This specific information processing
 265 failure, the framing effect, was first demonstrated by Tversky and Kahneman (1981). In their study,
 266 Tversky and Kahneman (1981) used the 'Asian Disease Problem', an experimental paradigm used to
 267 test how the framing of a problem affected decisions about possible solutions. In this experiment,
 268 participants are given a scenario in which they are warned about the outbreak of a dangerous disease,
 269 expected to kill 600 people. Subjects then had to decide whether to opt for a risky solution or a
 270 certain solution. When participants were presented with the risks framed as the number of lives

271 saved, participants preferred to go for the secure solution. However, when presented with the solution
272 framed as the number of deaths, participants preferred to go for the risky solution. This study shows
273 that when outcomes focused on the number of lives lost, participants were likely to opt for solutions
274 which involved larger risks.

275 These results might be highly relevant to the current world situation, where decisions about
276 responding to the virus need to be made in the face of an overwhelming public focus on the number
277 of deaths being reported. The framing in the press also adds to the spreading of fear, as well as
278 shaping public opinion and attitudes (Ogbodo et al., 2020). Recent research suggests that time
279 pressure amplifies the framing effects (Diederich et al., 2018). That is why the death rate statistics, as
280 focused on by the news and general public, could result in unnecessarily high-risk decisions being
281 made (Ioannidis, 2020). When approaching decision-making in such a complex situation, a broader
282 focus is needed, in order to make decisions that accurately weigh up all the possible consequences,
283 and don't overly focus on a single factor or outcome. In the Covid-19 pandemic specifically, the
284 framing effect increases the chance that governments will focus on high-risk, high-reward solutions,
285 which could result in overly harsh, or overly lax measures being taken without proper consideration
286 of the available data (Karnes, 2008; Kühberger, 1998; Pieri, 2019). While encouraging a fast
287 recovery from the pandemic is important, avoiding unnecessary risks to the health, wellbeing, and
288 security of individuals must take precedent, and all options need to be weighed up and considered.

289 During the current crisis, individuals face risks not only from the spread of the virus itself, but also
290 the extensive array of negative side effects currently affecting global communities, many of which
291 are indirect effects of the pandemic, stemming from lockdowns and other preventative measures.
292 Mental health problems, social inequalities, and secondary health issues have all shown to be
293 potential side effects of the crisis which communities may face (Pfefferbaum & North, 2020; Reger
294 et al., 2020; Schippers, 2020; Zetsche & Consiglio, 2020). However, even as individuals face all
295 these effects, they often underestimate how quickly these effects are likely to spread, as a result of
296 exponential-growth prediction bias. During the Covid-19 crisis this bias occurs when people look at
297 the data of previous and existing spread of the virus, and its secondary side effects, and without
298 taking into consideration the speed of exponential growth, significantly underestimate the spread in
299 the future (Banerjee et al., 2020; Wagenaar & Sagaria, 1975). This further highlights the need to
300 focus on decisions driven by data and prior research. As the situation continues to unfold,
301 information and data is limited and constantly being updated, and there has been some criticism of
302 the use of interventions without full consideration of the real-life evidence of their impact (Haushofer
303 & Metcalf, 2020). However, reflexive decision-making focuses on data driven decisions,
304 highlighting the need to create disconfirmable statements, which weighs up and considers all
305 available information, even if that information is not yet complete. During this pandemic large
306 decision-making groups need to make sure they do not get caught up in treating the surface level
307 symptoms of the crisis, while overlooking the underlying causes.

308 **2.3 Failure to Revise and Update Conclusions**

309 As the Covid-19 crisis is still evolving, it will be key that groups remain flexible, and are able to
310 evaluate and change their course of action if it becomes necessary (Whitworth, 2020). A failure to
311 revise and update conclusions in a situation like this could have dire consequences (Schippers, 2020;
312 Zetsche & Consiglio, 2020). Given the uncertain nature of this situation, it is understandable that
313 decisions made at any given point may no longer be the best decision as the situation continues to
314 change (Tolcott et al., 1989). As new information becomes available, and more widespread effects of
315 the crisis become visible, it is crucial that policymakers are able to reflect on the actions they have

316 taken, and when necessary, make adjustments and changes (cf. Schippers et al., 2014). However, this
 317 is more difficult than it seems. A common bias during team decision making is escalation of
 318 commitment, where people keep investing more resources in a set course of action, even in the face
 319 of clear evidence that the course of action is not working, or that better options are available (Arkes
 320 & Blumer, 1985; Dijkstra & Hong, 2019; for a review see Sleesman et al., 2018). A recent review
 321 suggested that an explanation for this phenomenon in groups lies in the need to publicly stand by and
 322 justify prior decisions, and that this tendency is magnified in diverse groups (Sleesman et al., 2018).
 323 In the current crisis, the situation is also being framed as a “war against an invisible enemy” (Wicke
 324 & Bolognesi, 2020) which may also contribute to the focus on “defeating this enemy”. On the one
 325 hand, this may lead to the breeding of fear and anxiety, harsh emergency measures, compromised
 326 democracy, dividing communities and may even legitimize the use of actual military action (Wicke
 327 & Bolognesi, 2020). An additional problem is that the discussion around this problem is highly
 328 moralized, dividing people into “patriots” and people to blame (Caduff, 2020). This results in
 329 information to be suppressed, lowering the chances to learn new information and update conclusions.
 330 On the other hand, media reporting using absolute numbers magnifies fear and increases the.
 331 However, prior studies have shown that in order to function effectively, it is key that a group is able
 332 to adapt to new information and circumstances, although the difficulty of their goal is often inversely
 333 related with their likelihood to effectively do so (LePine, 2005). Reflexive decision making is
 334 therefore an ongoing process, where policymakers continuously reassess the situation, and make sure
 335 to continue gathering and weighing all newly arising information (cf. Ioannidis, 2020). And when
 336 new or updated information calls for a change in direction, this is a step that policymakers need to be
 337 prepared for, and willing to take. Up until now, not so much the pandemic itself, but the steps taken
 338 by governments make this pandemic unprecedented. Most likely, governments also overestimate the
 339 extent to which the situation can be controlled and this illusion of control is quite damaging. As crisis
 340 management seems to have moving goalposts, policy makers likely see the current situation as an
 341 opportunity to push agenda’s and reshape the world (Caduff, 2020). It is therefore necessary to
 342 clearly outline a policy that is ready to update conclusions and builds on evidence-based solutions. In
 343 going forward, recently three eminent epidemiologists and public health experts from Harvard,
 344 Oxford and Stanford published the Great Barrington Declaration, arguing for an alternative approach
 345 to dealing with the Covid-19 crisis. Thousands of practitioners and scientists have signed this
 346 declaration, arguing for focused protection in order to reduce the “collateral harms” and serious
 347 consequences ensuing from the prolonged lockdowns and measures (Lenzer, 2020). At the same
 348 time, others argue for “multi-prolonged population-level strategies” (Alwan et al., 2020). Decision
 349 makers face the task of constantly weighing all information and updating conclusions, using a
 350 holistic approach.

351 **3 Conclusion**

352 The current paper aimed to renew and update the findings of Schippers et al. (2014), by adding to and
 353 applying the understanding of information-processing failures to decision-making during the current
 354 Covid-19 crisis. The risk of biases and errors in decision-making has the potential to cause
 355 widespread damages, and it is of vital importance that policymakers take steps to minimize these
 356 effects (Halpern et al., 2020). Focusing too narrowly on the problem of containing the virus, failing
 357 to take a more holistic approach may lead to decision-making that fails to take into account all
 358 consequences (Ioannidis et al., 2020). If not, the destructive consequences of the measures in terms of
 359 lives and livelihoods may hunt humanity for decades to come (Caduff, 2020; Joffe, 2020; Schippers,
 360 2020)). Overall, increasing group reflexivity may offer the key to helping groups improve their
 361 decision-making process by minimizing the occurrence and effect of information-processing errors.
 362 This paper recommends several tools for use by decision-making groups to help counteract

363 information-processing biases. Prior research has also developed several tools to assess and help
364 increase overall team reflexivity (Otte et al., 2017; Schippers et al., 2007). These include appointing a
365 strategic dissenter in the decision making team, creating psychological safety for speaking up, and
366 avoiding overreliance on experts (Emmerling & Rooders, 2020). While the crisis is still unfolding, it
367 is difficult to judge which decision-making processes most governments have implemented, as the
368 process is often not transparent. This makes it very difficult to infer how the decisions were made on
369 the basis of their outcomes. While others have pointed to specific biases that seem to be apparent in
370 decision-making (e.g. Halpern et al., 2020), with this paper I aimed to classify these and suggest tools
371 to counteract these information processing failures.

372 More research will be necessary to examine government's decision-making processes. As more
373 information becomes available, researchers should examine what decision-making processes were
374 used by various groups during this crisis, which processes resulted in the best outcomes, and how
375 these processes can be implemented for use in future crisis decision-making. However, with the crisis
376 already in full swing, information-processing failures may have already had an impact on decisions
377 made (Halpern et al., 2020). Future decisions regarding this crisis would do well to go for solutions
378 that take a more holistic approach and take into account the wider social and economic consequences.
379 Implementing a reflexive decision-making process could help policymakers going forward and allow
380 them to maximize the chances of good outcomes in the future.

381

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384

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387

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642 Table 1

643 Overview of checklist items to ensure minimization of groupthink. Adapted from (Janis & Mann,
644 1977)

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- Allowing team members the chance to critically assess the actions of the group and promotes criticism of his judgements.
 - The leader / manager is impartial and does not state their personal opinions, especially at the beginning of the discussion
 - When a complex problem must be addressed, the team works it out in parallel groups, and then returns to discuss it as a whole afterwards
 - When evaluating the feasibility and effectiveness of certain decisions, the group occasionally splits into two or more subgroups for discussions
 - Each group member regularly discusses the direction of the group with third parties from outside the team, and seeks feedback on the group process
 - Outside experts are invited to contribute to the discussion
 - A group member is assigned to the role of “devil’s advocate “during meetings, and their role is to highlight the disadvantages of any discussed actions, in order to promote the discussion about consequences
 - Organize a second chance assessment, in which after reaching a provision consensus, group members will still get the chance to consider a second opinion, with a chance for reconsideration

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