

Justification and decision analysis

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Abstract

When decision sciences are applied to concrete problems, Decision Makers (DMs), concerned stakeholders, and the general public typically expect clear recommendations. But in fact any recommendations contained in the conclusions will be conditioned by norms or normative conceptions. This article explores the attitude to norms in the academic literature. We argue that these attitudes share a critical blind spot: they neglect or trivialize the task of helping the DMs to make up their minds about norms. As an alternative to these attitudes, we introduce and recommend a higher level norm on the basis of which, in a given decision situation, a decision analyst can decide, together with the DM, whether a given norm underlying a given recommendation can be adopted. The point of this higher level norm is to enable the subsequent choices to be justified by the decision analyst and the decision maker. We then identify and discuss a series of requirements that the notion of justification should embody.

Keywords: Decision Analysis, Normative Economics, Legitimacy, Morality, Ethics of Operational Research

1. Introduction

When analysts use decision sciences to tackle a given concrete problem, they are commonly expected by Decision Makers (DMs), concerned stakeholders and the general public to formulate recommendations R . Such R are inevitably conditioned by norms, normative conceptions, values or value judgments N (Funtowicz and Ravetz, 1993; Brans, 2002; Mingers, 2011).

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Preprint submitted to Elsevier

28 We understand this N in a very broad sense, and take it to refer to all the
29 elements that analysts have to associate with factual statements in order
30 to derive recommendations. They may include or reflect implicitly or ex-
31 plicitly held philosophical stances concerning objectives of decision analysis
32 in general, professional deontology, the ethics of analysts’ relationships with
33 clients, but also norms specifying good practices in using various methods,
34 and so on.

35 The importance of these normative elements N is largely acknowledged
36 in the Operational Research (OR) literature (Churchman, 1970; Taket, 1994;
37 Brans and Gallo, 2007; Picavet, 2009), because “OR is a human activity in
38 which OR workers engage with other humans to improve human-activity
39 systems” (Ormerod and Ulrich, 2013), which unavoidably raises “explicit or
40 implicit moral issues” (Diekmann, 2013). There is a large consensus, in both
41 OR (e.g. Williams (2009), p.285) and economics (Dwyer, 1985; Heath, 1994;
42 Sen, 2004; Mongin, 2006; Baujard, 2013), that, due to this importance of
43 N , objectivity and scientific neutrality, if understood in an absolute sense,
44 are unachievable and irrelevant (Le Menestrel and Van Wassenhove, 2004;
45 Reisach, 2016).

46 However, most authors also claim that OR analysts have a duty to re-
47 main neutral with respect to DMS – echoing Kant’s tenet of duty ethics,
48 translated by Reisach (2016) as a right that every human being enjoys to
49 set her own objectives. Gass’s (2009) “Oath of Prometheus” similarly starts
50 with a reference to DM’s goals. A weaker form of neutrality, encapsulated
51 in the requirement to refrain from being *dogmatic, paternalist, proselyte, or*
52 *authoritarian*, by imposing N we favor in our interaction with DMS, is hence
53 largely accepted. However, because “most contributions to the ‘ethics’ of
54 OR, well-taken as they are in drawing our attention to the value content
55 of all OR practice, tell us (...) little about how to handle ethical conflicts”
56 (Ormerod and Ulrich, 2013), this literature barely explores how to make sure
57 that the N underlying recommendations do not conflict with DMS’ values.
58 The present article attempts to contribute an answer to this question.

59 **Example 1.** *Let us introduce a simple example, to be used in the entire*
60 *article. We start with an abstract presentation, which we then instantiate*

61 *in a concrete setting.*

62 *Imagine that an analyst is asked by a DM to help him decide whether*
63 *he should implement a given project P . The analyst uses cost-benefit anal-*
64 *ysis (CBA) (Layard and Glaister, 1994) and ends-up formulating a recom-*
65 *mendation $R = “P \text{ should be implemented}”$. This recommendation is not*
66 *unconditional. Thanks to her analysis of the context and her computations,*
67 *the analyst derives R from norms N , entrenching the relevance of using*
68 *CBA to decide whether P should be implemented. In this case, N contains*
69 *norms characterizing philosophical or ethical stances, including a version of*
70 *utilitarianism stipulating that one should maximize the sum of a measure*
71 *of preference inferred from willingness to pay (Meinard et al., 2016). But*
72 *N also encompasses other norms, more or less clearly articulated, referring*
73 *to the usual requirements for a CBA to be considered to be “properly” imple-*
74 *mented, such as the claim that the preferences taken into account in the study*
75 *are the relevant ones, that no important costs and benefits was ignored, that*
76 *the preference elicitation methods used correctly capture preferences, etc.*

77 *A concrete instantiation of this abstract example is given by the request,*
78 *through a public procurement procedure, by the local administration in the*
79 *Var Department (South-east France), in 2013, to analyze a project to restore*
80 *dry grasslands in the Lachens summit, a natural mountainous area destroyed*
81 *by the construction of military buildings which are now abandoned (Meinard*
82 *et al., 2015). In this concrete instantiation, R refers to a recommendation*
83 *to restore dry grasslands. The elements composing N refer, among other*
84 *things, to the claim that the analyst properly implemented the relevant pro-*
85 *cedures, that he properly identified the whole set of relevant stakeholders to*
86 *include in his survey, that he properly computed the value of the various*
87 *ecosystem services that could accrue from the restored dry grasslands, etc.*

88 *In both contexts, the question that we aim to tackle is: when, as decision*
89 *analysts, we apply decision sciences to solve the practical problems at issue,*
90 *how should we handle the anchorage of our recommendations in norms, so*
91 *as to remain neutral (in the sense given above to this term)?*

92 We tackle this question as part of a broader research program analyzing
93 the role of researchers in decision support, in particular in public policy, in
94 the wake of questions initially articulated by Tsoukiàs et al. (2013). This
95 program includes analyzes of the concepts of legitimacy (Meinard, 2017),
96 meaning (Meinard and Gharbi, 2018), rationality (Meinard and Tsoukiàs,
97 2019) and argumentation (Cailloux and Meinard, 2018), and applications in
98 environmental policy evaluations (Jeanmougin et al., 2017) and recommen-

99 dations (Choulak et al., 2019). The present article pursues these efforts by
 100 addressing the role of the norms underlying decision support interventions.

101 We begin (in section 2) by exploring attitudes of decision analysts with
 102 respect to N in the economic and philosophical literature. We argue that
 103 these various attitudes share a critical blind spot: they neglect or trivialize
 104 the task to help the DM to make up her mind about N . By contrast, we
 105 argue (in section 3) that this task is pivotal, and that decision analysts
 106 should endorse a “higher level” norm \mathcal{N} , embodying the requirement to
 107 produce *justifications*, understood in a specific sense that we elaborate. We
 108 call \mathcal{N} a “higher level” norm because \mathcal{N} can be used to establish if this or
 109 that N can be used in a given application of decision sciences, but in itself
 110 \mathcal{N} is too abstract for any R to be directly derived from it. We use here
 111 a comparative term (“higher”), because our point is simply that \mathcal{N} does
 112 not play the same role as N , and places itself “upstream” N (elaborating
 113 a precise and complete typology of norms falls beyond the scope of this
 114 article). We flesh out \mathcal{N} as a series of four simple rules that applications
 115 of decisions sciences should follow in order to help the DM make up her
 116 mind about the normative elements underlying the decision analysis she is
 117 provided with. Section 4 then briefly concludes.

118 2. Varieties of attitudes with respect to N

119 In this section, we review attitudes with respect to N in the economic and
 120 philosophical literature. Our approach to establish this typology is interpre-
 121 tative: we infer a proposal for a classification based on our knowledge of the
 122 literature in economics, philosophy and OR. Like any hermeneutic claim,
 123 our proposed typology is tentative. We distinguish four attitudes (A_O , A_E ,
 124 A_I and A_J) which are reminiscent of Le Menestrel and Van Wassenhove’s
 125 (2004) distinction between “ethics outside” (echoing our A_O), “inside” (echo-
 126 ing A_E) and “beyond the model” (of which our A_I and A_J can be seen as
 127 variants). However, our topic is broader, since we are interested here in
 128 the role that N play in a decision support process as a whole, not only in
 129 models.

130 2.1. *Elusive economic attitudes with respect to N*

131 2.1.1. A_O : *The elusive search for “basic” N*

132 In normative economics, a widespread approach, which we will call A_O
133 (“ O ” stands for “obvious”), consists in insulating supposedly simple and
134 clear norms. Such norms N are considered to be simple enough to let DMS
135 decide, without the help of the analyst, if they endorse them. It is then
136 possible to derive R from the chosen N .

137 Identifying such basic N however proves more difficult than one might
138 expect. Indeed, as Sen (1967) observes, a value may appear convincing
139 but fail to be basic, in the sense that there may exist facts whose knowledge
140 would lead an individual, originally supporting this value, to cease to support
141 it. Or a value may conflict with another value, and the individual may cease
142 to support one of them upon realizing this conflict. Because this might hold
143 even for norms such as Pareto Dominance (Sen, 1984, ch. 5 and 6), A_O
144 appears untenable. To illustrate this idea, consider Arrow’s (2012) theorem.
145 (This illustration has been suggested to us by Ulle Endriss.) It shows that
146 Dictatorship follows (in some formal context) from the axioms of Universal
147 Domain, Pareto Dominance, and Independence of Irrelevant Alternatives.
148 One can easily imagine that individuals would accept each of these axioms
149 as capturing value judgments they endorse about what they demand from a
150 voting rule, if the axioms were explained to them by focusing only on what
151 each axiom demands separately, even though they would reject Dictatorship.
152 One therefore cannot rest content with the bare fact that a norm N seems
153 self-evident in the abstract, since one can reject a seemingly self-evident N
154 on due reflection, once one has come to realize some of N ’s implications.

155 A_O hence flouts neutrality by surreptitiously accepting the unwarranted
156 premise that some norms N can be found about which DMS can readily make
157 up their mind.

158 2.1.2. A_E : *choosing N that Decision Makers “would endorse if they could
159 understand”*

160 A second attitude, A_E (where “ E ” stands for “expert”), consists in claim-
161 ing that DMS cannot systematically take the time to strive to understand N

162 or are not always willing or able to do so. Decision scientists holding this atti-
 163 tude claim that they have the collective skills to understand decision science
 164 and discuss among peers whether this or that N should be accepted. But
 165 they do not consider that DMS should take part in such discussions, because
 166 these are technical, difficult discussions. When they arrive at conclusions
 167 including recommendations R , predicated on N encapsulating axioms that
 168 decision scientists collectively deem commendable, they consider themselves
 169 entitled to jump to R without bothering to help DMS to make up their mind
 170 about N .

171 Attitude A_E consists, for the decision analyst, in endorsing a higher-level
 172 norm \mathcal{N}_E claiming that expert discussions about norms enable them to make
 173 decisions about norms on behalf of DMS, a questionable moral stance that
 174 Estlund (2009) calls the “expert/boss fallacy”. It is unlikely that many de-
 175 cision scientists really wholeheartedly endorse it. Besides, to the best of our
 176 knowledge, the literature does not specify what is precisely required (when
 177 adopting \mathcal{N}_E) for an expert to decide that “enough” discussion has taken
 178 place in the expert community and that a consensus has been reached con-
 179 cerning a given N . Furthermore, the fact that a norm has been considered
 180 acceptable in the abstract by the scientific community does not guarantee
 181 that it is acceptable in its use by the analyst in a concrete context.

182 2.1.3. A_I : informally testing whether Decision Makers endorse N

183 The blatant weaknesses of A_E suggest a pragmatic variant, A_I , with I
 184 standing for “informal”. This is the attitude of decision analysts who reject
 185 A_E ’s idea that decision scientists can decide on N on behalf of DMS, and
 186 therefore make a point of informally discussing the meaning of N with DMS
 187 to verify that N appears endorsable to the DMS.

188 Roy (1996) can be seen as a prominent supporter of A_I . Indeed, although
 189 he did not use the term “norm” to refer to elements underlying recommen-
 190 dations, he emphasized the need to develop interactions with the DM to
 191 ensure that, not only the recommendations, but also the building blocks of
 192 the decision support process from which they derive should be “meaningful”
 193 for the DM. This meaningfulness requirement can be interpreted as a need

194 to render the various elements of the decision support process intelligible for
 195 the DM. And because R are necessarily anchored in N , this intelligibility
 196 requirement unavoidably includes a requirement that the DM *endorses* N .
 197 Roy (1996) hence implicitly championed a requirement to informally test
 198 whether DMS endorse N . As another example, one can think about Raiffa's
 199 (1985) claim that, in some cases, discussions with DMS rejecting subjective
 200 expected utility theory can lead them to accept it after all.

201 The problem with A_I is that it combines a scientific approach to arrive
 202 at R , with an informal, loose approach to lead DMS to make up their mind
 203 about N . Like A_E , it is anchored in a higher level norm \mathcal{N}_I . But this higher
 204 level norm is not clearly articulated. It encapsulates the idea that decision
 205 analysts cannot make decisions about N on behalf of DMS, but does not
 206 specify precisely what they should do.

207 2.1.4. A_J : *appealing to justifications of N*

208 Although they do not explicitly tackle our problem, many authors in
 209 the literature, especially in ethics and methodology of OR, endorse a fourth
 210 attitude that can seem to offer a solution to our problem. This candidate
 211 solution consists in advocating that analysts should *justify* the decision sup-
 212 port they provide, and in particular should justify the N from which their
 213 recommendations derive. For example, Lahtinen et al. (2017) advocate OR
 214 practices following an “ideal path”, “formed by well-*justified* choices”. Sim-
 215 ilarly, Diekmann's (2013) defense of “transparency” is explicitly anchored
 216 in a justification requirement, defining transparency in terms of “open com-
 217 munication” and “clarification”. His presentation of “integrity” explicitly
 218 refers to “justification”. Beauchamp's (2009) criteria to balance principles
 219 when they conflict also explicitly refer to justification. White and Taket's
 220 (1994) call to desacralise expertise enjoin experts to justify their interven-
 221 tion. Jackson (1999) concurs on the importance of justification and spells out
 222 “guidelines” that justifications “must” follow to “claim to have used a man-
 223 agement science methodology according to a particular rationale”. Ormerod
 224 (2010) even argues that a willingness to justify is a necessary condition for
 225 decision scientists to present themselves as *scientists*.

226 This pervasive reference to a justification requirement is, however, ar-
227 guably too vague. Indeed, the term “justification” is extremely polysemous.
228 In some contexts, one might call any argument, however spurious or ill-
229 conceived, a “justification”, and the above contributions do not elaborate
230 on how to make sure that a given purported justification really qualifies as
231 a “successful” or “good” justification (or as a justification *stricto sensu*) –
232 which is difficult question, *a fortiori* when purported justifications have to
233 do with normative elements. Jackson (1999), for example, details proto-
234 typical arguments that can be used to structure justifications, but does not
235 explore how to ensure that an argument based on his guidelines qualifies as a
236 justification: his “guidelines” are, in that sense, more “buiding blocks” than
237 guidelines. A_J hence appears unsatisfactory because it takes for granted
238 that the notion of justification is transparent and unproblematic, whereas
239 on due reflection this notion appears ambiguous.

240 **Example 2.** *Let us simply illustrate the meaning of attitudes A_O , A_E , A_I*
241 *and A_J in our hypothetical scenario of an application of CBA.*

242 A_O would mean, for the analyst, that she claims that it is clear and
243 evident for DMs to decide whether they endorse, not only preference utilitar-
244 ianism, but also all the more or less clearly articulated norms specifying all
245 the requirements for a CBA to be considered to be “properly” implemented.

246 A_E , by contrast, acknowledges that DMs can find it difficult to understand
247 the meaning of this N , and might be at a loss trying to decide whether they
248 should endorse it. An analyst adopting A_E would hence fall back upon a
249 community of researchers endorsing N to take the decision to endorse N on
250 behalf of DMs.

251 An analyst adopting A_I would find A_E unacceptable, and would infor-
252 mally strive to discuss with the DM to help him decide whether he endorses
253 N . But to accomplish this task, the analyst will be left without a rigorous
254 methodology. Similarly, an analyst adopting A_J would make a point to jus-
255 tify the N from which her recommendation derives, but for lack of a deeper
256 analysis of what “justification” amounts to, she would find herself incapable
257 of telling whether or not the justification she produces is a good justification.

258

259 2.2. *Philosophical explorations of higher level norms*

260 We argued in the former subsection that the attitudes currently found in
261 the decision science literature are unsatisfactory. A_E and A_I however suggest
262 an interesting solution, which consists in referring to a higher level norm,
263 and A_J goes a step further by claiming that this higher level norm might
264 be a justification requirement. The philosophical literature contains inter-
265 esting, deeper explorations of this idea, in particular in debates on “purely
266 procedural” vs. “substantive” normative theories in political philosophy.

267 Substantive theories account for justice and democracy by explicitly re-
268 ferring to values, whereas purely procedural normative theories strive to
269 avoid value judgments. Rawls (2005)’s normative theory of democratic le-
270 gitimacy is a classical example of a purely procedural theory. Rawls did
271 not want his theory to make any value judgment about the kind of state
272 of affairs that should prevail in a democratic society. He therefore argued
273 that a policy is democratically legitimate if it is based on a constitution
274 whose justification is acceptable by all “reasonable” citizens, and he further
275 argued that the very definition of reasonableness should be something for
276 reasonable citizens to pick-up. He thereby attempted to eschew making any
277 value judgments in his account of legitimacy and reasonableness. This was
278 supposed to be a complete “flight from substance” (Estlund, 2009), in the
279 sense that this account was supposed to eschew all forms of value judgments.

280 This approach hence elaborates on the idea to produce justifications,
281 anchors this idea in a reference to acceptability, but strives to eschew spec-
282 ifying criteria to distinguish acceptable justifications from non-acceptable
283 ones.

284 This approach arguably fails, however, for reasons articulated by Haber-
285 mas and Estlund. Estlund (2009) noticed that, if one accepts, following
286 Rawls, that the notion of reasonableness should be selected by reasonable
287 people themselves, then there is an “impervious” plurality of groups that
288 could select themselves as being “reasonable”. He concluded that rawlsian
289 political philosophers have no choice but to render the concept of reason-
290 ableness more precise, by specifying the values underlying it. Habermas
291 (1995) criticizes Rawls’s presentation of his notions of “veil of ignorance”

292 and “overlapping consensus” as *devices* whose real-life functioning can give
 293 rise to principles of justice. According to Habermas (1995), these notions are
 294 rather rhetorical tools thanks to which Rawls exposes principles of justice
 295 that he surreptitiously deduces from various philosophical notions, such as
 296 the one of a moral person, which he (perhaps unconsciously) presupposes.
 297 Rawls’s “flight from substance” hence collapses in a retreat back to the sub-
 298 stantial inquiry into the nature and features of a moral subject. Rawls’s
 299 theory therefore is anchored in a higher level norm \mathcal{N}_R , but this higher level
 300 norm is not thematized as such in his philosophy.

301 By contrast, in his debate with Rawls on the theory of justice, Haber-
 302 mas (1983) goes a step further by analyzing the higher level norm underlying
 303 his own theory (though he does not use this vocabulary), by introducing
 304 a “weak” transcendental deduction of the tenets of “discourse ethics” from
 305 communicative action. Habermas (1981) argues that agents communicat-
 306 ing with each other make validity claims of three sorts: veritative claims
 307 about truth, normative claims about values and norms, and authenticity
 308 claims about expressions concerning their inner life, feelings and conscious-
 309 ness. The role that norms play is therefore clearly circumscribed in Haber-
 310 mas’s framework, it concerns one kind of validity claims among others, and
 311 Habermas would probably not claim that recommendations based on such
 312 norms can be justified. Habermas (1983) however does not locate the tenets
 313 of “discourse ethics” at this level. He rather argues that all the acts and
 314 deeds that consist in making validity claims are oriented by a strive for in-
 315 tercomprehension, which lies at the core of communicative action. And he
 316 identifies the tenets of discourse ethics as conditions of possibility for this
 317 intercomprehension-oriented activity.

318 The norms specifically constituting Habermas’s discourse ethic are hence
 319 anchored in his philosophy of society, which endows them with a specific
 320 justification referring to Habermas’s theory of communicative action. Ac-
 321 cording to this theory, it would be pointless to expect DMS to make up their
 322 mind about these norms, because they are conditions of possibility for a
 323 very basic, all-pervasive structure of human action. Their justification is
 324 hence unassailable – or so, the argument goes. As opposed to proponents of

325 A_E , Habermas hence develops foundations to entrench his \mathcal{N}_H , and these
326 foundations provide him with a reason to claim that a justification based on
327 these foundations is a good justification, which permit to go beyond attitude
328 A_J . These foundations are, however, derived from his very specific under-
329 standing of communication and its importance in the functioning of human
330 societies, which has been extensively criticized in the literature (Heath, 2001;
331 Honneth, 1985; Benhabib, 1992).

332 **3. The recommended approach**

333 In this section, our aim is to elaborate on the idea outlined by A_J and (ac-
334 cording to our argument) unsatisfactorily elaborated by Rawls and Habermas,
335 according to which a convenient higher level norm \mathcal{N} should embody
336 a justification requirement.

337 We begin with the notion of justification in general: at this level of
338 generality, a justification requirement is innocuous. We then progressively
339 clarify and flesh out this idea so as to articulate a concrete notion of justifi-
340 cation. Such a concrete notion should no longer be ambiguous, and should
341 enable us to identify a satisfactory \mathcal{N} . To that end, our approach will be
342 similar to the one typically used in ordinary language philosophy (Soames,
343 2003): we will draw on everyday intuitions about the meaning of the term
344 “justification”, and strive to progressively sharpen a specific definition that
345 the term should take in order to play the role that we want it to play, in
346 the very specific context in which we want to use it. To do so, we will take
347 advantage of the arguments developed above against the various attitudes
348 presented in the former section to sharpen our understanding of the idea of
349 a *satisfactory justification* in our context.

350 In the two subsections below, using this approach, we identify a series of
351 requirements that the notion of justification should embody (these subsec-
352 tions draw on provisional ideas introduced by Meinard (2013, 2017)). The
353 third subsection then presents a set of practical rules that materialize these
354 requirements and participate in fleshing them out. These practical rules
355 specify the attitude that a decision analyst should have, if he sets himself
356 the task to produce *satisfactory justifications* for the N grounding his R .

357 3.1. *Three requirements*

358 Any notion of justification should be specified by criteria. But what
359 criteria should one use? Here we introduce three requirements encapsulating
360 the criteria that, we argue, are relevant to capture the notion of justification
361 that we need.

362 3.1.1. *Incrementalism*

363 As we have seen, \mathcal{N}_E encapsulates a criterion: N should be considered
364 consensual among decision science experts. \mathcal{N}_E presupposes that this cri-
365 terion is clear and determined. However, one cannot find, in the literature,
366 any elaboration of how this criterion is supposed to be checked. This blind
367 spot obfuscates the idea that such a consensus, if it existed, would certainly
368 evolve as decision science knowledge improves. A more satisfactory version
369 of \mathcal{N}_E would hence clarify the meaning of this criterion, and would thereby
370 in particular highlight that the content of the criterion is liable to change
371 as knowledge improves, incrementally. The same idea applies to \mathcal{N}_R and
372 \mathcal{N}_H . We have seen that the former is anchored in an implicit philosophy of
373 the moral subject, and the latter in a theory of society. But both theories
374 can be questioned, and more satisfactory versions of \mathcal{N}_R and \mathcal{N}_H should
375 accept and openly display their provisional status (Habermas (1983) does
376 emphasize this point – discussing whether this claim is coherent with the
377 larger habermassian framework falls beyond the scope of this article).

378 This first analysis of part of the shortcomings of \mathcal{N}_E , \mathcal{N}_R and \mathcal{N}_H hence
379 suggests the need to integrate, in our notion of justification, an *incremen-*
380 *talism* requirement, holding that it is illusory to claim to be able to capture
381 a definitive list of criteria defining what is a satisfactory justification. Ac-
382 cording to “incrementalism”, one had better work incrementally, to improve
383 step by step one’s understanding of the relevant criteria. “Incrementalism”
384 reflects the idea that even experts have limited capacities to identify defini-
385 tive solutions to the problems they are entrusted to tackle, and therefore
386 their conclusions cannot be considered to be definitive solutions.

387 *3.1.2. Anchorage in real-life acceptability*

388 Another problematic feature that our exploration of A_E illustrated is
389 that it conceives the elaboration and application of \mathcal{N}_E as tasks for decision
390 scientists alone to tackle. By contrast, Rawls and Habermas wanted their
391 theories not to grant the philosopher the right to preempt discussions con-
392 cerning N – an idea also supported by attitude A_I . Rawls introduced this
393 idea thanks to his notion of “reasonableness”, which Estlund rearticulated at
394 a more general level as an acceptability requirement. We have seen that, at
395 least according to Habermas and Estlund, Rawls’s argument is flawed. But
396 a core underlying idea remains, in our view, pivotal to elaborate a relevant
397 notion of justification: whether a justification is satisfactory should depend
398 on how people in the flesh receive and react to purported justifications. If we
399 want to identify criteria distinguishing acceptable from unacceptable justifi-
400 cations, instead of searching for such criteria through theoretical reflection,
401 we should take the stance that consists in putting justifications to the test
402 in real-life situations, so as to improve gradually our blunt understanding of
403 what it means for a justification to be acceptable.

404 *3.1.3. Interventionism*

405 The latter requirement might suggest the following approach, inspired
406 by the sociological literature on “orders of justification” (Boltanski and
407 Thévenot, 2006). According to this literature, various groups in various
408 situations typically refer to different and largely irreconcilable “orders of
409 justifications”, which can (according to some authors at least) be formalized
410 as sets of normative axioms accepted by some groups but rejected by others.

411 Drawing on this literature, one could set out to use sociological surveys
412 determining in which groups the people concerned by a given application of
413 decision sciences fall, and produce recommendations justified by the axioms
414 endorsed by those people in the situation at issue. Such an approach can
415 be seen as a refinement of A_O : it accounts for cases where different people
416 find different norms self-evident, but it still requires that people judge by
417 themselves whether they consider a given norm to be self-evident. In par-
418 ticular, it might be that people accept some norms only because they have

419 not realized all their implications.

420 In order to integrate such reactions, we need a notion of justification that
421 does not reduce the acceptability of justifications to the bare acceptance of
422 discourses. This requirement obviously echoes Habermas’s and Estlund’s
423 criticism of Rawls’s notion of “reasonable”: if it is to make sense, Rawls’s
424 theory cannot be about justifications that real people usually accept or will
425 accept, it must be about justifications that citizens *would* accept, if they
426 were reasonable. Habermas (1992) forcefully emphasizes this counterfactual
427 aspect in his theory of legitimacy, but this leaves his approach vulnerable
428 to the criticism that he talks about counterfactual worlds in outer space. In
429 our view, the important idea that Habermas’s reasoning conceals is that the
430 notion of acceptability is only convincing if one accepts that the philosopher
431 or the decision scientist, trying to capture what people can find acceptable,
432 allows himself to interact with those people, and thereby goes beyond the
433 approach championed by authors like Boltanski and Thévenot (2006).

434 3.2. *Unfolding practical rules*

435 The former subsections allowed us to clarify important requirements that
436 the notion of justification should fulfill, in order to play the role we want
437 it to play in applications of decision sciences. We are now in a position
438 to clarify the contours of a practice of justifying that would fulfill those
439 requirements. This practice is materialized by a practical procedure, whose
440 steps are presented below. (The tenets constituting our practical procedure
441 bear a resemblance with Diekmann’s (2013) “mid-level” moral principles,
442 but they aim to be more general – not being limited to a specific activity
443 such as modeling – and are not derived from moral theories, but rather from
444 our higher level norm \mathcal{N} , which is designed to be more fundamental.)

445 Meinard (2017) attempted to elaborate a practical procedure of that sort
446 in an exploration of the concept of legitimacy. Here we will translate some
447 elements of this approach to our context, and also address what we take to
448 be weaknesses, so as to unfold a more satisfactory account. Our proposed
449 practical procedure will be articulated in four points.

450 A first requirement is designed to capture the idea that, as application

451 of “Anchorage in real-life acceptability”, in a context where an analyst offers
452 a recommendation R to a DM, the fact that the analyst endorses \mathcal{N} should
453 first and foremost take the form of his actually articulating justifications in
454 such a way that the DM understands them and is convinced by them.

455 In this setting, our first requirement (clause i) can be articulated as
456 follows: *Systematically display arguments in favor of the N from which our*
457 *recommendations derive.*

458 We emphasize that this task is more difficult than one might think at
459 first sight. Clarifying the N that the analysts endorses, often implicitly, re-
460 quires hermeneutic, communicative and interactive explorations which are
461 no less complex than those involved in clarifying the goals of the various
462 people involved in a decision process (Reisach, 2016). Besides, as Cronin
463 et al. (2014) point out, “Often participants may not even be aware of the
464 preconceptions, or assumptions, that they are taking for granted” and in-
465 teractions with DMs “are inevitably subject to various constraints some of
466 which arise pre-consciously as a result of historically acquired competences
467 and predispositions to operate in particular ways” (Brocklesby, 2009). Un-
468 folding clause i is therefore a challenging task. Making the effort to tackle it
469 can prove useful for the analyst himself to clarify his own assumptions. But
470 one should remain prudent and cannot assume that the exercise will always
471 be entirely successful.

472 A second point should prevent our using justifications that happen to
473 be accepted, as a matter of fact, at the moment when we articulate them,
474 but whose weaknesses are concealed. This point embodies “incrementalism”
475 and “interventionism”, by claiming that, once we have found arguments
476 in favor of something, we should try to look for ways through which they
477 could be discarded. Real-life examples of decision-aiding practices that flout
478 this clause are given in Meinard (2017), which lead him to introduce a re-
479 quirement to be ready to defend one’s recommendations against criticisms,
480 even when none are formulated. This requirement is insufficient, however.
481 Indeed, an account associating it with clause i would be impaired by a
482 worrying weakness, which can readily be identified by referring to the litera-
483 ture on epistemic injustice (Fricker, 2007) (this problem is not addressed by

Meinard (2017), and is also left aside by Mingers (2011), who mentions this issue without exploring it when acknowledging a limit to his own framework under the heading “Engagement and inclusion”). Some people and groups have access to knowledge, others have not. The former are in a position to articulate criticisms, the latter are not. By imposing that decision analysts should be ready to defend their recommendations, the above approach exposes applications of decision science only to part of the spectrum from which criticisms can come. What if many criticisms could have been addressed at us, but none were, because of epistemic injustices? In such a case, we cannot confidently claim that our approach materializes satisfactory justifications. There is therefore something amiss in the above account.

One might suggest that the problem could be fixed by identifying a specific group of people that should be the source of criticisms, or even a procedure that should be used to encourage the formulation of such criticisms. But this would mean presuming that we have the kind of perfect knowledge needed to identify *the* ultimate procedure once and for all.

The logic underlying “anchorage in real-life acceptability” offers a solution to this problem. We cannot identify once and for all a perfectly relevant group of people or a perfect procedure. What we can do is identify an attitude that will be conducive to more satisfactory justifications, and this attitude is a requirement to actively elicit criticisms. In some situations, this can imply enlarging the circle of people, groups or institutions involved in the decision process, for example as members of a steering committee. This inclusion of other people can by itself bring in new insights or information.

This requirement, Actively elicit criticisms (*ii*), is the missing element in our account; it can fix its first weakness.

We now need a third clause to allow clauses *i* and *ii* to fully embody the requirement to put justifications to the test in real-life, instead of confining them to theoretical criteria: Actively defend our recommendations against all criticisms (*iii*). Obviously enough, just like clause *i*, clause *iii* only makes sense as an application of “anchorage in real-life acceptability” because the “defense” at issue consists in articulating arguments that the

517 DM understands and that convince her.

518 Clauses *i* to *iii* spell out the attitude of experts who would enact a
519 willingness to justify themselves by displaying arguments in favor of the
520 norms underlying their stances, and by actively being willing to face dissi-
521 dent stances. But this account, although completed to fix the weaknesses
522 mentioned above, has another worrying weakness, which can be captured
523 by raising the question: when can one claim that one has produced *enough*
524 justifications? (This weakness was also ignored by Meinard (2017).) Indeed,
525 in practice, whatever the effort one makes to address all the criticisms that
526 one can think about, there is bound to remain infinitely numerous other pos-
527 sible criticisms – criticisms that one failed to think about, or even criticisms
528 that are not conceivable today, but that will emerge in the future, as knowl-
529 edge increases. Demanding that decision analysts abide by this apparently
530 infinite justificatory task might seem unrealistic.

531 This problem can be solved by applying “incrementalism” to the justi-
532 fiability of the decision analysis process. Incrementalism means that one
533 can never claim that one knows what the right criterion is to sort out ac-
534 ceptable justifications from unacceptable ones: proposed identifications of
535 “the right” criterion are always provisional. As a consequence, when im-
536 plementing clauses *i* to *iii*, the decision analyst must develop a provisional
537 account of the justifiability of the decision analysis she provides. The deci-
538 sion analyst can claim that her decision analysis is more justifiable thanks
539 to specific actions taken while implementing clauses *i* to *iii*, but not that
540 the decision analysis is justified in an absolute and definitive sense. This
541 adds a fourth clause to our account: Understand our own justifiability as
542 unavoidably provisional (*iv*).

543 The importance of this clause will be most evident in situations in which
544 the DM simply rejects the analyst’s attempts to discuss the relevance of *N*,
545 or ill-intentioned people willing to sabotage the decision process stubbornly
546 reject any defense of *N* or any alternative to *N*. In such cases, the analyst
547 will have to surrender at some point. But this surrender is not a failure of his
548 justification attempts. He will have failed if an alternative decision process
549 is launched whereby another decision analyst manages to develop a more

550 successful justification. In the absence of such a more successful alternative,
551 the first decision process should be considered provisionally justified.

552 To sum up, the approach that we recommend is that, as decision ana-
553 lysts implementing decision science in concrete situations so as to provide
554 recommendations, we should:

- 555 *i.* Systematically display arguments in favor of the N from which our
556 recommendations derive;
- 557 *ii.* Actively elicit criticisms;
- 558 *iii.* Actively defend our recommendations against all criticisms;
- 559 *iv.* Understand our own justifiability as unavoidably provisional.

560 Clearly enough, applying clauses *i* to *iv* is unlikely to ensure that we
561 will be able to identify *the* ultimate justification for our recommendations.
562 For that, we would need to have access to all the possible arguments, all
563 the possibly relevant information, and we would need a perfect definitive
564 definition of what a satisfactory justification is. The more modest ambition
565 of the present account is to provide a practical answer to the core question
566 of our inquiry: *as practitioners applying decision sciences to the resolution*
567 *of concrete problems, how can we make sure that the normative aspects of*
568 *the decision analysis that we provide do not lead us to take liberties with*
569 *our scientific neutrality by being dogmatic, paternalist, proselyte, or author-*
570 *itarian?* The answer that we propose is: *we can make sure that we remain*
571 *scientifically neutral by applying clauses i to iv.*

572 **Example 3.** *To illustrate the concrete meaning of our reasoning, let us see*
573 *how it applies to our example of a decision analyst using CBA to help a DM*
574 *to decide whether he should implement a given project P .*

575 *To apply clause i, instead of simply using the chosen method without*
576 *further discussion, the analyst should take upon herself to clarify the norms*
577 *N underlying her usage of this method, and explain to the DM why she*
578 *deems it relevant to accept N in the case at hand. An analyst who would*
579 *miss this step, for example because using CBA was part of the requirements*
580 *of the public procurement procedure through which she was chosen and she*
581 *assumes that she has nothing to say about the relevance of this requirement,*
582 *would fail to abide by clause i. To apply clauses ii and iii, the analyst should*
583 *set the discussions with the DM in such a way as to foster reactions and elicit*

584 criticisms when it comes to the relevance of *N*. For example, if the decision
585 analysis task is monitored by a steering committee, the analyst should take
586 advantage of the meetings with the committee to highlight possible reasons
587 either to accept or to reject *N*. If, thanks to her understanding of the local
588 context, the analyst suspects that the structure of the steering committee is
589 biased against a given group of stakeholders, she should suggest to the DM
590 to enlarge the committee to include those groups or external experts, and
591 thereby facilitate the emergence of possible criticisms. In the same vein, she
592 should do her best to take advantage of the scientific literature to identify
593 relevant arguments.

594 Let us now illustrate these ideas using our concrete example of the restoration
595 of dry grasslands on the Lachens summit (the account below is stylized
596 to some extent, in particular in that it focuses on exchange of arguments
597 between the analyst and the DM, and leaves aside the contributions of other
598 people, which are not directly relevant to our argument here). In its analysis
599 of the restoration project, the consultancy argued that using CBA was inappropriate
600 in this case, for two main reasons. First, they argued that, because
601 of knowledge gaps in the literature on restoration of the kind of natural habitats
602 at issue, it was impossible to compute the risks involved in the project.
603 Second, they argued that some of the likely consequences were such that using
604 CBA was ill-advised. Among these risks are possible impacts on populations
605 of rare species, in particular *Leucanthemum burnatii* Briq. & Cav., a rare
606 plant species (see the discussion of this issue by Meinard et al. (2016)). The
607 main recognized value of this species lies in its scarcity. Although it does
608 not provide any major ecosystem service and has no market value, botanists
609 around Europe consider that it has an intrinsic value as a rare species. A
610 prominent method used in the context of CBA to capture this kind of value is
611 the travel cost method, which, in its application in this case, would compute
612 the money that botanists are prepared to pay to make the trip to the Lachens
613 summit to see the species. A major problem for this method is that it does not
614 take account of the value that botanists who do not have the money to make
615 the trip bestow on the species. An important part of the value of the species
616 would hence be ignored if this method were used. Prominent alternatives to
617 this method are provided by stated-preferences methods. But here again the
618 consultancy argued that applying it would not give completely satisfactory
619 results, because the applicability of this method to biodiversity is debated in
620 the literature. Part of these arguments can be found in the technical report
621 produced by the consultancy (Meinard et al., 2015), but many were voiced
622 in meetings. In the end, although the initial demand was to implement a
623 complete CBA, the consultants did not do it, because they had reasons that

624 *they could articulate in discussions with the DM, the reasons being that they*
625 *believed they lacked the data and technologies needed to properly implement*
626 *this method. This means neither that the DM’s problem was unsolvable, nor*
627 *that other consultants could not have found a way to solve it using CBA. But*
628 *as it stands, the consultants who tried to solve the problem using CBA did not*
629 *find a satisfactory way to do it, and produced arguments which convinced the*
630 *DM that doing it was (possibly provisionally) impossible. Accordingly, this*
631 *endeavor to provide decision aid was justified, in the sense articulated above.*

632 The practical rules spelled out above echo Lahtinen et al.’s (2017) “path
633 approach” to OR activities, and their promotion of an “ideal path”, which
634 they describe as a “path formed by well-justified choices”. Our own practical
635 rules aim at spelling out in more concrete terms the requirements that
636 Lahtinen et al. (2017) refer to using terms such as “well-justified”, “essential
637 characteristics”, “reflective”. Similarly, our clause *i* echoes Funtowicz
638 and Ravetz’s (1993) claim that in post-normal science “values are not pre-
639 supposed but made explicit”, and our clause *ii* is reminiscent of Funtowicz
640 and Ravetz’s “extended peer community”. However, in our view Funtowicz
641 and Ravetz neglect the difficulties involved in implementing clauses *i* and *ii*,
642 which prompted us to introduce clauses *iii* and *iv* and, as opposed to Fun-
643 towicz and Ravetz, we argue that the clauses *i* to *iv* should be deployed in all
644 decision support processes, not only in situations characterized by high de-
645 cision stakes and systems uncertainties. Our proposed practical rule should
646 therefore be seen as complementary to the above contributions, which they
647 contribute to strengthen by clarifying a preliminary crucial step that they
648 tend to neglect. A similar relation exists with Mingers (2011), who delin-
649 eates applications of Habermas’ discourse ethics to OR practice, but refers
650 to the idea of “justifiability” without defining it and advocates that what is
651 important is “that every effort is made to involve and engage all the relevant
652 stakeholders in a genuine and continuing dialogue” without specifying how
653 to ensure that the dialog is “genuine”. Although, at this stage, we do not
654 explore in concrete behavioral terms the interaction between analysts and
655 DMs, our approach also interestingly echoes Hämäläinen et al. (2013) who
656 emphasize, in their review of the importance of taking behavioral aspects in
657 OR, “the phenomenon that people are less influenced by decision problem

658 framing, that is, by the way in which the information is presented, if they
659 are asked to give written reasons for their decision”. Our approach suggests
660 a path to implement this requirement in practice.

661 4. Conclusions

662 In this article, we have introduced an account of how, as decision ana-
663 lysts applying decision sciences to concrete situations, we should cope with
664 the normative aspects of our endeavor. Several aspects of this account echo
665 ideas developed by American pragmatist philosophers (Ormerod, 2006). In
666 particular, our approach to “justification” is anchored in an analysis of the
667 usages of the term, we propose to unfold the requirement to produce justifi-
668 cation as a practical procedure and, even more fundamentally, our original
669 research question only makes sense against the pragmatic background idea
670 that norms play a key role even in activities that other approaches would
671 categorize as entirely concerned with pure facts. However, beyond these
672 fundamental ideas, our reasoning is not tightly anchored in any specific
673 philosophical framework developed by authors in this school of thought. We
674 therefore do not place this contribution under the aegis of American prag-
675 matism.

676 To ponder on our proposed practical procedure, it is useful to mention
677 three prominent objections that one might want to raise against our ap-
678 proach. A first objection might come from decision scientists who would
679 reduce our argument to a simple call for decision analysts to justify their
680 recommendations, which, they might argue, is what decision analysts al-
681 ready do. This would miss an important aspect of our reasoning. Indeed,
682 our rationale emphasizes that recommendations necessarily rest on norms,
683 and stresses that decision analysts cannot eschew the need to help DMS to
684 make up their mind about those norms. Current practices address this issue
685 informally, if at all. By contrast, we argue that it is necessary to anchor this
686 important part of applied decision theory in a rigorous methodology – an
687 objective to which this article attempts to contribute. To that end, we have
688 proposed practical rules that decision analysts should follow in order to ob-
689 tain justified recommendations. If followed, these practical rules will modify

690 current practices. Cailloux and Meinard (2018) provide a first instantiation
691 of this account in a formal framework.

692 A second objection might come from decision analysts who would claim
693 that justification requirements command respect, but are impossible to im-
694 plement in practice. Such critics would claim that, in practice, decision
695 scientists have no choice but to pick up some norms N to derive recom-
696 mendations, and that any serious attempt to justify these norms would be
697 impractical. Justification requirements would be impractical indeed, if they
698 meant that any recommendation should be anchored in an “ultimate” justi-
699 fication. However, our reasoning is based on an incremental and provisional
700 approach to justifications: the justifications that we are interested in are
701 not “ultimate” in any sense, they are tentative and open to improvements.
702 Identifying such provisional justifications is far more practical than pretend-
703 ing to capture “ultimate justifications”, and we argue that it can be done in
704 practice by following our proposed practical rules.

705 A third objection is a radicalized version of the second one. It would
706 claim that, in practice, justification is irrelevant: the only relevant point is
707 that decision analysis should “work”. This idea is *prima facie* convincing, but
708 what does it mean for decision analysis to “work” or to be “value-adding”?
709 To a large extent, the successfulness of decision analysis hinges upon the
710 analyst’s capacity to justify it. In that sense, this would-be objection does
711 not seem to be a real objection after all. At the very least, the burden
712 of proof lies on critics who should be able to articulate it using a clear
713 explanation of what it means for decision analysis to work.

714 We see our contribution as an attempt to articulate (relatively) pre-
715 cise requirements that applications of decision sciences should follow, with
716 concrete, practical implications. We emphasize that the precision of those
717 requirements is limited in many respects. It provide neither a metric nor gen-
718 erally applicable mechanical means to compare any two applications of de-
719 cision sciences without discussions (Cailloux and Meinard (2018) introduce
720 the rudiments of a procedure liable to fulfill this more ambitious agenda).

721 Besides, our work in this article is focused on relatively simple situations
722 where the recommendations elaborated by the analyst are offered to a single,

well-identified DM. We thereby leave aside difficulties associated with group decisions (Jackson and Keys, 1984), stakeholder identification (Wang et al., 2015) and with boundary judgments involving the integration of several individuals in a collective DM (Midgley, 2000) – not for lack of interest, but because they are too complex to be tackled in the limited space of this article. One might want to criticize our approach by claiming that this restriction in effect confines our analysis to highly stylized decision processes never exemplified in real-life decision analysis. We rather see our contribution as an exploration of a fundamental aspect shared by all decision support processes, which is, in our view, insufficiently analyzed in the literature addressing decision processes in their full concrete complexity. In our view, the analysis of these more complex issues can benefit from our exploration, in the sense that the difficulties involved in aiding a single DM to make up his mind about the relevance of accepting a given norm are exacerbated in these more complex, pluri-actor settings. Similarly, although the requirement to justify can participate in unveiling, and thereby denouncing, power relations which could otherwise have distorted discussions and decisions, we cannot claim at this stage that our framework addresses all the problems liable to be generated by the pervasiveness of power relations in decision processes (Cronin et al., 2014). Another important aspect of decision processes that our framework does not explicitly addresses is the idea that OR might fail to serve the interest of the public or of those who cannot afford it (Rosenhead and Mitchell, 1986), which suggests a need for more critical and socially responsible OR practices (Jackson, 2000; Ulrich, 2003). This is reinforced by the context of environmental crisis, already stressed by Churchman (1970).

A prominent avenue for future research is therefore to explore how our framework can contribute to criticize and improve frameworks devoted to tackle these complex issues, such as “system of systems methodology” (Jackson and Keys, 1984), “critical heuristics” (Ulrich, 1987), “critical rationalism” (Ormerod, 2014), “systems thinking” (Mingers and White, 2010), “problem structuring methods” (Hector et al., 2009), “cognitive mapping” (Eden, 2004), “community operational research” (Johnson et al., 2018) or “stakeholder-oriented multi-criteria decision analysis” (De Brucker et al.,

2013). Another important avenue for future works is to explore how decision analysts can adjust their selection of methods (or their combination of parts of methods) in such a way as to reflect their difficulty to justify certain N with some DMS (Mingers, 1997).

Acknowledgements

We thank D. Bouyssou, S. Deparis, P. Grill, M. Nunez and J. Rouchier for powerful comments and suggestions on this manuscript.

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