

Davidsonian Limits on *Fast and Frugal Heuristics*

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Heuristics have been integrated into theories of human decision-making in order to explain contraventions of rationality criteria imposed by logical reasoning and maximization. Gigerenzer and the ABC research group argue that heuristics are not breaches of optimal judgement but adapted cognitive mechanisms for successful performance in real world environments. They suggest coherence conditions of rationality should be replaced by ecologically rational correspondence criteria. Davidson saw the ability to interpret the meaning of the utterances of others as necessitating coherence criteria for rationality. The sociality of language requires, in part, an approximate adherence to standards of consistency and transitivity. The complete flouting of such criteria would fatally undermine any attempt to make others intelligible. Davidson thus brings limits on the potential expansion of Gigerenzer's *fast and frugal* programme and, more broadly, on any version of ecological rationality that seeks to entirely dispense with coherence norms of rationality. ¹

What standards can we impose in order to determine if a decision or an utterance is rational? In answering this we implicitly reveal a vision of how the mind relates to its environment. Criticism has grown of theories of rationality which have ignored or severely underplayed the influence of the agent's environment. However, not all theories have considered the full set of relevant aspects in the human environment. Language is a crucial element of much human social interaction. The ability of humans to make sense of each other is an important clue as to how we should envisage ourselves as rational. Focusing here on *fast and frugal* heuristics (hereafter F&F), we will see the error of overlooking how interpretability must shape our concept of rationality. Our fundamental concern in this paper is to show how the centrality of truth in interpretation necessitates certain criteria of rationality which F&F wish to deny. This paper does not question the psychological plausibility of F&F; rather it will assume their existence. Ultimately, our argument will point to tension in the relationship between philosophy and psychology. However, let us begin with a brief discussion of the F&F theory. ²

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² F&F is researched within the [ABC Program](#) and mainly associated with the psychologist [Gerd Gigerenzer](#). These are used interchangeably.

Fast and Frugal Heuristics

F&F fall under the broader theory of ecological rationality (ER). ER can be divided into *Institutional ER* and *Individual ER*. F&F are part of the latter. The division is merely a matter of focus, both concurring with and depending upon the other.

Institutional ER, at present most commonly associated with Vernon L. Smith, dismisses the 'constructivist' stance that institutions have been consciously designed through reason. Instead, Institutional ER proposes "an emergent order based on trial-and-error cultural and biological evolutionary processes" (Smith, 2003:500). Institutional ER takes its inspiration from the likes of Hume, Adam Smith and Hayek whose writings on property rights and free markets are seen as prototypical descriptions of the emergence of ecologically rational social arrangements.

Individual ER, our focus, concentrates on the aspects of human psychology which ultimately allow for these emergent institutions. Individual ER is concerned with human psychology as reflecting the fact that we are evolved organisms that have adapted to a particular environment. The functional psychology of John Dewey, the developmental theories of Lev Vygotsky and extensive work in the field of perception by the likes of J.J. Gibson all pushed for acknowledgement of the impact an individual's environment has on his or her sensory experience. Particularly influential for F&F, by their own lights, was Egon Brunswik of whom Gigerenzer (2000:55) glowingly wrote: "From him one can learn to rethink that which is taken for granted. I have." Gigerenzer and Kurz (in Hammond and Stewart 2001:346) say that "what we call ecological rationality is an elaboration of the Brunswikian program of studying the texture of environments."

For Gigerenzer, though Kahneman and Tversky, with their heuristics and biases research programme, were right to query the myth of perfectly rational cognisers, they were wrong to attribute patterns of human decision making as *deviations* from this normative ideal. In 1996, three years prior to the keystone publication *Simple Heuristics that Make Us Smart*, Gigerenzer published a criticism of the 'heuristics and biases' programme in which he says:

"In place of plausible heuristics that explain everything and nothing—not even the conditions that trigger one heuristic rather than another—we will need models that make surprising (and falsifiable) predictions and that reveal the mental processes that explain both valid and invalid judgment."(1996:595)³

With F&F he attempted to satisfy this need.

The initial murmurings of F&F are in Gigerenzer, Hoffrage and Kleinbölting's (1991) theory of Probabilistic Mental Models (PMM). This theory endeavours to give an account of the systematic spontaneous over-confidence expressed by individuals with regard to their own general knowledge. A PMM uses an

³ For a response see Kahneman and Tversky (1996)

inductive inference by placing the specific problem into a broader context, linking the particular structure of the task with a probability structure of a corresponding natural environment, where this refers to a knowledge domain familiar to the individual. This probability structure is contained in the individual's long term memory. The PMM is both non-local and indirect, having to appeal to a network of variables for indirect inference (Gigerenzer, Hoffrage and Kleinbölting, 1991:4). Crucially, in terms of F&F, people's over-confidence is explained not by cognitive errors but rather the individual's environment (Gigerenzer, Hoffrage and Kleinbölting, 1991:36).

What kinds of heuristics are *fast and frugal*? Typically they share the following five traits:

1. ecologically rational (that is, they exploit structures of information in the environment)
2. founded in evolved psychological capacities such as memory and the perceptual system
3. fast, frugal, and simple enough to operate effectively when time, knowledge, and computational capacity are limited
4. precise enough to be modelled computationally
5. powerful enough to model both good and poor reasoning

(Goldstein and Gigerenzer, 2002:75)

The collection of heuristics at the disposal of our species is metaphorically known as the 'adaptive toolbox' (Gigerenzer, Todd and ABC Research Group, 1999). There is some debate over whether F&F implies massive modularity. Carruthers (2006:182) calls them "natural bedfellows and mutual supporters". However, Todd, Fiddick and Krauss (2000: 379) vigorously deny the suggestion. Heuristics are domain specific, that is, each one exploits the particular information of a given environment. This implies a rejection of the view of the mind as a general all-purpose computation machine (Gigerenzer, 1999: 18-19).

An example of a *fast and frugal* heuristic is "Take-the-Best". It describes how a person establishes an ordering of cues through their perceived validities which they then use to guide search. The heuristic moves to take the cue with the highest validity with validity (V) of a cue (i):

$$V_i = \frac{R_i}{R_i + W_i}$$

where R_i is the number of correct inferences and W_i the number of incorrect inferences based on the cue alone. If it does not discriminate, they then move to take the next best cue and so forth (Gigerenzer, Todd and ABC Research Group, 1999:81).

There are a large, and growing, number of F&F under review:

- *Take the First* (Johnson and Raab, 2003)
- *Take the Best* (Gigerenzer and Goldstein in Gigerenzer, 1999)
- *Take the Next Best* (Todd and Miller in Gigerenzer, 1999)
- *Take the Very Best* (Martignon, in Gigerenzer and Selten, 2001)
- *Gaze* (Gigerenzer, 2008)
- *Equal Allocation* (Gigerenzer, 2008)
- *Equal Weighting* (Goldstein in Gigerenzer and Selten, 2001)
- *Tit-for-Tat* (Gigerenzer, 2008)
- *Quick-Est* (Hertwig, Hoffrage and Martignon in Gigerenzer, 1999)
- *Categorization by Elimination* (Berretty, Todd and Martignon in Gigerenzer, 1999)
- *Imitation* (Sadrieh in Gigerenzer and Selten, 2001)
- *Minimalist* (Gigerenzer, 2000)
- *Sophisticated Minimalist* (Martignon in Gigerenzer and Selten, 2001)
- *Try-a-Dozen* (Todd and Miller in Gigerenzer, 1999)
- *Mind-Reading* (Gigerenzer, 2008)
- *Tools-to-Theories* (Gigerenzer, 2000)
- *Simple-Feeding* (Davis and Todd in Gigerenzer, 1999)
- *Matching heuristic* (Dhami and Ayton 2001)
- *Default* (Johnson & Goldstein, 2003)
- *Priority* (Brandslatter, Gigerenzer and Hertwig, 2006)

The explicit linking of human judgement to evolutionary processes, in this way, is part of an effort by F&F to decouple rationality from decision theoretic optimization models. Evolution is not about abstractly optimal solutions, it is about relatively superior ones (Dupré, 2001:43). F&F does not appeal to rationality in the “classical sense” but rather these heuristics are measured according to the extent to which they match the structure of the environment they operate within (Gigerenzer and Kurz in Hammond and Stewart 2001:346). Hence, F&F can be understood as attempting to shift expectations of human judgement from coherence to correspondence criteria:

“We do not compare human judgement with the laws of logic or probability, but rather examine how it fares in real-world environments. The function of heuristics is not to be coherent. Rather, their function is to make reasonable, adaptive inferences about the real social and physical world given limited time and knowledge. Hence, we should evaluate the performance of heuristics by criteria that reflect this function. Measures that relate decision-making strategies to the external world are called correspondence criteria (Hammond, 1996).” (Gigerenzer, 1999:22)

For Hammond (1996:95), who Gigerenzer references above, the aim of a coherence metatheory of judgement is to give a description and an explanation of the way in which a person’s judgements can achieve logical, mathematical or probabilistic rationality. A correspondence metatheory should account for the process by which a person’s judgements are empirically accurate. In other words, under coherence criteria, x is rational if it does not contradict the set of which x is a part. Standards of coherence, then, are broadly equivalent to the

norms of decision theory, such as consistency and transitivity. In contrast, correspondence criteria of rationality state that *x* is rational if it matches a fact about the world. Accordingly, *x* should exhibit accuracy, computational frugality and speed in decision-making.

More specifically, consistency and transitivity are not *a priori* constraints on human reasoning for F&F: “the heuristics in the adaptive toolbox also do not take consistency as a *sine qua non* for rational behaviour” (Gigerenzer, 2001:41). Moreover, “intransitivity does not necessarily imply high levels of inaccuracy, nor does transitivity guarantee high levels of accuracy – logic and adaptive behaviour are logically distinct” (Gigerenzer, 1999:22). Instead, the fitness benefit of meeting correspondence criteria is key to understanding the development of certain F&F. Using less and only the most relevant information has an adaptive advantage against those that take more time to compute all the information, even that which may not be of direct significance to a solution (Ketelaar and Todd, 2001:181). Violations of coherence criteria are themselves seen as adaptive (Rieskamp, Busemeyer and Mellers, 2006:632).

F&F claims to follow a “radical alternative” by linking rationality and psychology, a pair hitherto divided. This radical alternative is to judge cognition according to correspondence criteria established in consideration of an organism responding to evolutionary pressures in an environment with a particular structure. This fundamentally alters both how we think of psychological mechanisms and how we develop experimental methodologies (Ketelaar and Todd, 2001:193). While Kahneman and Tversky tried to demonstrate in what circumstances aspirational coherence is difficult for humans to achieve, Gigerenzer and his colleagues argue that these “narrow and content blind” standards never were that important for the evolved brain (Mosier and McCauley in Kirlik, 2006:165). Thus, they announce: “The ABC program *dispenses* with the focus on coherence criteria...as the yardstick of rationality” (Gigerenzer, 1999:28) [Emphasis Added].

DONALD DAVIDSON

Donald Davidson shows us, however, that a general state of consistency and transitivity *is* required since it is necessary for there to be intelligible interpretation between communicators. Davidson asked what is it we could come to know that would allow us to interpret the utterances of another. In trying to answer this question, he became dissatisfied with treatments of meaning. Attempts to give an account of meaning were, in his eyes, faulty for various reasons. Some presupposed interpretation by relying on intention. Others unjustifiably reified it. Those who were appealing to the linguistic conventions of a community of speakers are only placing a fog over the necessary conditions of an interpretable language. Since we are not debilitated by malapropism in understanding the meaning of another’s utterances, convention, though clearly a part of our day to day usage, is not deeply explanatory.

What none of these could provide for Davidson was an account of what makes interpretation possible, independent of the concepts of meaning, synonymy and interpretation themselves. In other words, none could break from the circle of interdependence between belief and meaning whereby interpreting the meaning of sentences requires the attribution of beliefs while, simultaneously, the attribution of beliefs necessitates already designated meanings (CS:195).

Davidson engages a form of thought experiment which has precedents in Wittgenstein's explorer and Quine's radical translator (Hopkins, 1999). In this fabricated context we must establish the procedure for which an interpreter can find the meaning of another's utterances without any prior knowledge of the other's mental states; hence it is a *radical* interpretation. A satisfactory procedure should also be capable of handling the compositional nature of a language, if it is to be learnable for a creature of limited abilities, with evidence that is plausibly available to the interpreter and no appeal to meanings as entities (INT, 2001, xv). A successful procedure should reveal some crucial element about the meaning-belief relation that is essential to language. This is an abstract project that does not attempt to describe how we actually engage in communicating with each other but to clarify our understanding via transcendental argument, understood as taking the following form: 1. Identifying phenomenon that one's interlocutor agrees exists 2. Investigating the necessary conditions for the possibility of that phenomenon 3. Examining the philosophical implications of the resulting 'transcendental analysis' of the possibility of the phenomenon (Carpenter, 2003:219). Think of it in this analogical way; imagine we wish to figure out how a particular group managed to travel across a certain sea to another land. We agree they did so because they currently inhabit the place so we wish to chart a possible means of how they got there. In doing so, we are not saying this is how they actually did it but we do manage to show that it was indeed possible. In fact, crucially, in identifying a possible travelling route we can identify certain necessary restrictions on how the journey could have occurred. Thus transcendental argument provides us with limits on how it may have happened. This is how we should see Davidson's abstract project of interpretation.

His suggestion for an interpretative procedure? Davidson turns to a modified version of Tarski's Theory of Truth to provide a theory of meaning in extensional terms. Tarski developed a 'semantic conception of truth' for formal languages following the Aristotelian lead: "To say of what is that it is not, or of what is not that it is, is false, while to say of what is that it is, or of what is not that it is not, is true" (in Tarski, 1944:343). This would take the form (T), that is: *X is true if, and only if, p*. Where "p" replaces any sentence to which "true" refers and "X" is replaced by the name of this sentence. Given a basic conception of truth "X" and "p" are logically equivalent (Tarski, 1944:344).

Davidson modifies Tarski's theory in two important ways in order that it be applicable to *natural* languages. Firstly, he makes the theory of truth relative to times and speakers. Secondly, he reverses assumptions; truth is assumed to attain meaning, whereas Tarski had worked conversely (BBM:149-150). Given this theory of truth, a radical interpreter can identify sentences which the

speaker holds to be true (whether or not they are indeed true). *Holding true* is a general attitude that does not presuppose the meanings of the sentences held true nor the contents of the beliefs that produce them. Thus, we are "holding belief constant as far as possible while solving for meaning" (RI:137).

However, holding true is not absolute. Radical interpretation would have to account for varying degrees of holding true. Davidson realised that an analogous problem is encountered in decision theory. Ramsey outlined how we could disentangle belief and desire by merely analysing a person's preferences over options of a conditional variety or 'gambles'. Radical interpretation is similarly restrained to observable behaviour to unravel the fusion of meaning and belief. Yet the problem arose: preferences over what? 'Gambles' presuppose interpretation in supposing a speaker will consider the connection between an event and an outcome as a gamble and indeed even as causal. Davidson sees a way forward in Jeffrey's (1965) version of Bayesian decision theory by substituting uninterpreted sentences for his use of propositions. Davidson can thus adapt Jeffrey's desirability axiom for the purposes of interpretation. Attaching a certain subjective probability of a sentence being true for a speaker allows us to track the belief of the agent with relation to the meaning of the utterance (UT:164).

This may appear dense so we can legitimately ask what does such an argument give us? Can such an approach constrain an empirically grounded psychology? What Davidson suggests is that there are inherent connections built into natural languages as revealed by this discussion of radical interpretation. The logical architecture of a natural language is unveiled when understood in terms of a theory that regards each sentence as constituted by an accountability to truth for the words it contains (MTM:205). This holist position sees each sentence as unavoidably tied to an unspecified number of others according to strictures of truth:

"...the interest in logical form comes from an interest in logical geography: to give the logical form of a sentence is to give its logical location in the totality of sentences. To describe it in a way that explicitly determines what sentences it entails and what sentences it is entailed by." (LFC:140).

Of course, many have attempted to discover aspects of natural languages that are stubborn to the application of Tarski's truth theory for interpretation⁴. They argue that Tarski's theory is really, as Tarski himself thought, only applicable to formal languages. However, the consequences of these criticisms should not be overplayed. Rorty (1980:261-262) explains Davidson's true objective best as not to put philosophical problems in a formal mode, nor to explain the connection of our words to the world but rather "to lay out perspicuously the relation between parts of a social practice (the use of certain sentences) and other parts (the use of other sentences)." That natural languages should be completely accounted for

⁴ For example, see Katz's intensionality argument (LePore, 1986:7-8) and Foster's objection (LePore and Ludwig, 2005:113-118)

by the axioms of a Tarski-like truth theory seems a needless ambition for Davidson (TP:53), for this is

*“far more than is provided by any theory anyone has been able to provide for any natural language. The condition therefore is not one we know could be satisfied. We do, on the other hand know how to produce such a theory for a powerful, perhaps self-sufficient, fragment of English and other natural languages, and this is enough to give substance to the idea that the incorporation of the concept of truth as a theory provides insight into the nature of the concept”.*⁵

This should not be taken to mean that efforts to tease out the breadth of application of a truth theory for natural languages are useless. On the contrary, such efforts are indispensable to understanding the relations between sentences. What does appear to be futile is the ambition to provide a fully comprehensive application. Do we stop searching the oceans when someone speaks of a sea-floor? The core point is that by detailing, if even only in an approximate way, the structure of a natural language we can see the way in which linguistic utterances must imply each other (CON, 45:58).

There is no understanding a sentence without understanding under what conditions it is true. It begins in childhood where one-word sentences are ostensibly learned without the need for a concept of truth as a result of some innate mechanisms. This is the world of the prototypical pragmatist where success and truth are equivalent. However, the introduction of basic grammar allows for some linguistic independence and what follows relies on a base of truth (CT:113). Meaning is parasitic on the ability of the interpreter to understand under what conditions the utterance would be true (TP:141). Understanding a sentence depends upon knowing the extension of its predicates and what the singular terms supposedly refer to. This extends into providing the support for understanding much more complicated utterances. Grasping “first meanings” allows the interpreter to comprehend jokes, metaphors, mistakes, and so on (ND:93). It is fundamentally the exploitation of this truth-induced inferential pattern which allows us to make sense of each other.

Truth, a necessary condition for intelligible communication, becomes the fulcrum upon which interpretation turns. Hence, it is possible to say that propositions imply other propositions in a patterned way, in a truth preserving way. Yet, how is this exploited? The Principle of Charity (or Rational Accommodation), which originated with Neil Wilson (1959) and was popularised by Quine (1960), takes advantage of this logical structure via two sub-principles: Principle of Correspondence and the Principle of Coherence. The former assumes that the speaker is mostly right about their perceptual environment and the latter attributes rationality to the speaker (Joseph, 2004:62,66).⁶

⁵ Davidson recalls how with former student, John Wallace, he sat down to apply the technique of radical interpretation to the entire text of Tolstoy’s *War and Peace* to find they could not progress passed the first line (CON)

⁶ Ultimately, Davidson argues that the coherence/correspondence division is unhelpful, both are essential. Our intention here however, is merely to defend the point that coherence criteria are indispensable.

Applying it “across the board” the radical interpreter first identifies predicates, singular terms, quantifiers, connectives and identity, then goes to work on indexical sentences and finally on all remaining sentences which do not depend systematically on change in the environment for example metaphorical sentences and theoretical sentences. Following Quine, Davidson asserts that belief and meaning cannot be uniquely constructed from speech behaviour thus a consequence, for any such theory of meaning, is indeterminacy. Nevertheless, it is a partial mist, not a dense fog, and as long as the expectations of the theory are fulfilled, it will yield interpretations capable of successful communication (RI:139). The attribution of perceptual accuracy, the Principle of Correspondence, is supported by Davidson’s externalist position⁷, but on what basis can we defend the attribution of a Principle of Coherence?

An interpreter, Davidson tells us, engages a *passing theory* and a *prior theory* in an effort to understand another. The prior theory consists in how he is prepared beforehand to interpret an utterance of a speaker while his passing theory is how he actually interprets them (ND:101-102). What kind of prior theory could an interpreter undertake?

Consider: I am in the woods with a ‘native’ who I am trying to interpret. Suddenly, he becomes animated and shouts “Le lapin!”. Given that I see a rabbit in his general eye-line dart over the hill, I construct the hypothesis that my speaker takes ‘Le Lapin’ to mean rabbit or in other words: ‘Le lapin’ is true if and only if rabbit is true. After a long day strolling in the countryside I see a rabbit on the plains, I point and say “Le lapin” but he dissents. What am I to think? I shall worry that my hypothesis is wrong and will attempt to reconfigure it. Maybe “Le lapin” is true if and only if movement on the hill is true. If my hypothesis was hitherto exceptionally strong I will go so far as to provide him with good reasons for error; he’s tired and is not paying attention, that big tree there was in his way, it’s darker and more difficult to see now than it was earlier. Anything other than attributing blatant inconsistency. Davidson (WF:217) states:

“inconsistencies impose a strain on the attribution and explanation of beliefs (and of course other propositional attitudes). It is such considerations that make the attribution of straightforward contradiction - a belief in obvious contradiction-unintelligible.”

I, the interpreter, must undertake the strategy that if x is true at time t for me and the speaker while x is also true at time t1 *for me*, then I am to take it to be true for the speaker also, *ceteris paribus* (PP:238). In the end “crediting people with a large degree of consistency cannot be counted mere charity: it is unavoidable if we are to be in a position to accuse them meaningfully of error and some degree of irrationality” (ME:221).

Beliefs form a general pattern. They are relational, that is connected to each other in a particular way. To further this thought Davidson (WPM) makes an

⁷ Which cannot be elaborated upon here, however, see Davidson’s EE for the influence of Burge.

analogy between weight and belief. The scale that will come to measure weight requires that the ratios between numbers remain the same with the absolute values of the numbers being of no consequence. I can measure the weight of a brick in pounds or grams and both are equally valid. In fact, I could record the weight on any scale which is a linear transformation of either one of these and rightfully claim to have reported an accurate measure. It is, of course, *only within* the relational scale that the weight measure is endowed with any meaning. A fundamental type of relation between measures is transitivity. This allows us to say of some object *x* that it is heavier than, longer than, colder than some other object *y*, where *x* and *y* fall under some viable theory that constitutes such objects.

Just as there are no such entities as weights there are no such things as beliefs. Nevertheless, they serve an explanatory purpose in revealing the relations amongst various psychological states. Moreover, it is similarly only intelligible to attribute a propositional attitude where it fits into a pattern. Thus, if a propositional attitude is to be attributed at all, we must be, for the most part, able to assume transitive connections. *In so far as* thought is propositional we can see how transitivity is an unavoidable norm that must be adopted in an attempt to preserve truth relations between sentences in the process of interpretation. On another walk with the local, I establish another two hypotheses. Observing the speaker, I postulate the hypothesis: "Nicholas est le père de Jean" is true if and only if Nicholas is the father of Jean. Also, I form the hypothesis "Le père de Jean est vieux" is true if and only if the father of Jean is old. With a high degree of confidence in these I see I can deduce a transitive relation: $x(\text{"Nicholas"})=y(\text{"le père de Jean"})$ and $y(\text{"le père de Jean"})=z(\text{"vieux"})$ therefore I can add a further interpretative hypothesis: "Nicholas est vieux" is true if and only if Nicholas is old. Clearly, my theory could fall down at many junctures, for instance, my companion may have two different Jeans in mind. My work now will be to *verify* this *expected* transitive relation. If I cannot appropriate the evidence that this inferred sentence is correct I will be looking for reasons why this is not so. It seems that permitting systematic intransitive connections between utterances would impose insurmountable difficulties for the interpreter. As Davidson says:

"...I do not think we can clearly say what should convince us that a man at a given time (without change of mind) preferred a to b, b to c, and c to a. The reason for this difficulty is that we cannot make good sense of an attribution of preference except against a background of coherent attitudes" (PP:237).

What would it be to understand someone who believed that Nicholas is the father of Jean and that the father of Jean (the same Jean) is old but does not hold that Nicholas (the same Nicholas) is old?⁸ We can agree with Strawson (1952:55) on many of the limitations of transitive relations for ordinary language such as the clearly unreliable "Tom hates Harry, and Harry hates Richard, so Tom hates Richard"⁹. Nevertheless, we can still maintain that the application of transitivity

⁸ Extreme interpretative failure without compensating reasons is no doubt part of our common understanding of mental-illness. See S.Evnine (1989)

⁹ But see Quine (1953)

to the speaker is necessary for many of his most basic utterances if he is to be made intelligible; it must at least be the starting point from which we attempt to make the speaker intelligible. Thus an interpreter has no choice but to adopt a prior theory that incorporates the presumption of engaging with a broadly consistent and transitive speaker.

CONCLUSION

F&F has called for human rationality to be seen in terms of the relationship between an evolved organism and the environment to which it has adapted. However, since rationality must be explained within the nexus of human social interaction, this necessitates the consideration of language. In order to make intelligible the utterances of others we must assume general consistency and transitivity. F&F wants to reject rationality based on normative standards of coherence. Yet explaining rationality in terms of evolution does not preclude coherence, indeed it must not, otherwise we would be unintelligible to each other. This is more broadly applicable to any theory of ecological rationality. The significance placed here on transcendental argument demands of us that we consider the extent to which the philosophical approach can place limits of the work of empirical psychology. If we are to take Davidson seriously then we must recognise the constraints the *a priori* can impose on the work of psychologists. The philosopher, Colin McGinn (1982:4) says "So the philosopher wishes to know, without being roused from his armchair, what is *essential* to the various mental phenomena; the psychologist's aim is at once more ambitious and more modest – he wants to discover by empirical means the actual workings of this or that creature's mind." F&F challenges the autonomy of these projects; a dramatic case where that which is deemed vital of any mind by philosophy is thought to be redundant with regard to the human mind by psychology. Gigerenzer has done much to forge an alternative way of viewing human rationality, one that avoids deriding or deifying human abilities. His heuristics do well to account for correspondence based low-level reasoning. However, F&F has failed to consider all relevant aspects of the human environment, especially intersubjective communication. Due to this omission, F&F has been able to deem standards of rationality based on coherence as unnecessary. This is a mistake. The whole of human rationality relies on both coherence and correspondence and it is this that must be explained through the cooperation of both philosophy and psychology.

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