Recursionist Theories of Knowledge

1 Introduction

1.1 Aim and format

A framework for recursionist theories of knowledge, is developed, to resolve Gettier style problems, and articulate a variety of epistemologies.

The approach is predicated upon the assumptions that Gettier problems are genuine, that there is no consensus that they cannot be resolved, and that there is no agreement upon how to resolve them. Moreover, as a solution is proposed, it is obviously assumed that the Gettier problems can be resolved.

Since the literature on Gettier problems is so immense, it is an aim to not discuss other contributions. Instead, the emphasis will be the systematic one of presenting and defending the recursionist resolutions.

A distinct feature of the recursionist resolutions is that *recursive resources* are invoked in the definitional apparatus, and it is assumed that these have a leading role in avoiding the problems.

It is an aim to be as impartial as possible on controversial issues concerning notions as *belief*, *truth* and *justification*, and for that purpose we abide by the following:

NEUTRALITY MAXIM: *Do not unnecessarily commit to a point of view!*

An important advantage with following the neutrality maxim, is that it helps secure a variety of recursionist theories of knowledge, with distinctive features. Therefrom, the neutrality maxim also helps focus more precisely upon the most central problems which produce the Gettier perplexities, for it implies abstraction from irrelevant features.

The ensuing subsections of this section are ordered as the corresponding sections further below, and partial accounts of the latter are related.

1.2 Presuppositions

The section clarifies in what sense *propositions* are taken to be the objects of belief, and a distinction between beliefs and believeds, is introduced. A notion of being *justified on* is defined. The neutrality maxim is put to work, so that a number of noncommittals about the nature of *truth*, *justification* and *belief* are expressed.

1.3 Recursionist Approaches to Knowledge

Recursive recursionist definitions, of S *knows that p*, are advanced, using concepts discussed earlier and a notion of *consecution* is introduced to distinguish between beliefs in a relevant way.

1.4 Gettier's Examples

Gettier's examples are analyzed, to show that recursionist epistemologies avoid them.

1.5 Conclusion

It is argued that it is difficult to find counter examples to recursionist epistemologies.

2 Presuppositions

2.1 The objects of belief

It is rather imprecisely, assumed that there are propositions, *or* declarative sentences, *or*, perhaps, elements of a language of thought, *or*, related entities, which are the *objects of belief.* The term *proposition* is adopted, but this is not intended to signify a commitment to a specific theory concerning the objects of belief.

2.2 Beliefs, believeds, dispositions and implicitness

S's belief that *q*, *S believes q*, has the proposition *q* as its *believed*. S believes a believed just if disposed to endorse it, and a belief is tacit (implicit) just if not occurrent (explicit).

2.3 Justification on, neither doxastic nor veridical

S is *justified on q* just if S is justified in believing *q*. S may neither be justified on *q* nor on *not-q*, and it may be that S is justified on a proposition and on its negation. It is not assumed that *S* is justified on *q* only if S believes *q*, or only if *q* is true.

2.4 Neutrality on internalism and externalism

In accordance with the neutrality maxim, it is not assumed that justification comes about by proper ligations between the subject and its surroundings, as argued by externalists, or by proper relations to other justifications, or beliefs, as argued by internalists.

2.5 Neutrality on deontologism

It is not presupposed that S is justified on *q* only if S has *the right* to believe *q*.

2.6 Neutrality on foundationalism, coherentism or infinitarianism

The approach developed here is neutral as to whether justification comes about as proposed by coherentists, foundationalists or infinitarianists.

2.7 Neutrality on truth and paradox

Uncontroversially, it is presupposed that a subject knows a proposition only if it is true. In some cases quantification over propositions is allowed. Consequently, paradoxes threaten in the vicinity. Abiding by the neutrality maxim, the approach presented here does not commit to a theory on how one should deal with the semantic problem just mentioned, and we strive to frame the epistemological examples we discuss in such way as to not engender paradoxes. As a consequence, there is a variety of recursionist points of view corresponding with a variety of ways to deal with semantical and set theoretical paradoxes.

3 Recursionist approaches to knowledge

3.1 Because

Let a dyadic sentence operator be *doubly veridical*, just if it is true of two operands only when both of the latter are true. Let *because* be a doubly veridical dyadic sentence operator, so that S believes q because S believes p only if S believes p and S believes q.

Salient notions as *inference*, *explanation* and *cause*, which are left unanalysed, enter in necessary conditions for versions of the *because* operator to hold of two operands. It is presupposed that S believes q because S believes p only if S infers q from p, *or* the fact that S believes p (partly) explains the fact that S believes q, *or* the occurrence of the event that S believes p causes the occurrence of the event that S believes q.

On account of the neutrality maxim, the minimal framework does not impose further conditions as *irreflexivity* or *acyclicality* upon the *because*-relation. So, for example, some, but not all, recursionist theories of knowledge will assume that the *because*-relation is irreflexive.

3.2 The recursive definition of knowledge

Using notions discussed above, recursive definitions of S *knows that* p are advanced:

Definition 3.2.1. (Informal version)

S knows that q *just if* q is true, (i)

S believes that q, (ii)

S is justified on q & (iii)

If for some p, S is justified on p and S believes q because S believes p, then for some p, S believes q because S believes p, and S knows that p and S knows that p only if q (iv)

Definition 3.2.2. (Formal version)

Let $\mathcal{K}_q^S$ signifiy that S knows that $q, \mathcal{T}q$ that q is true, B_q^S that S believes q, J_q^S that S is justified on $q,$ and $\mathbb{S}_q^p$ that S believes q because S believes p:

$$\mathcal{K}_q^S \leftrightarrow \mathcal{T}q \wedge \mathcal{B}_q^S \wedge \mathcal{J}_q^S \wedge (\exists p(\mathbb{S}_q^p \wedge \mathcal{J}_p^S) \rightarrow \exists p(\mathbb{S}_q^p \wedge \mathcal{K}_p^S \wedge \mathcal{K}_{(p \rightarrow q)}^S))$$

$\mathcal{K}$ has only positive occurrences in the definiens of definition 3.2.2, so the definition is only seemingly circular, in the sense that it can be expressed, equivalently, without circularity, by a use of impredicative resources, in a higher order logic. Likewise, the informal definition 3.2.1, is only apparently circular, in that sense.

3.3 Epistemic consecutions and varieties of recursionist theories

The following definitions are used to differentiate between prime, primal, cyclical and infinitary beliefs:

Definition 3.3.1.

a: For $1 < n \in \omega$ and $s = (s_0, \ldots, s_{n-1})$ an n-tuple, s *begins* with s_0 and terminates with s_{n-1}. Moreover, for $0 \leq i < j < n$, s_i precedes s_j, and s_j succeeds s_i. ω-tuples, as per d, have a beginning, but no termination.

b: A 2-consecution to q_0, for S, is a 2-tuple $\langle q_0, q_1 \rangle$, such that S believes q_0, S is justified on q_0, S believes q_0 because S believes q_1, and S is justified on q_1.

c: An $(n+1)$-consecution to q_0 for S, is an extension, of a given n-consecution, $(q_0, \ldots, q_{n-1})$, to q_0 for S, to an $(n+1)$-tuple $(q_0, \ldots, q_{n-1}, q_n)$, by appending a believed q_n, which is such that for $m < n$, S believes q_m, S is justified on q_m, S believes q_m because S believes q_{m+1}, S believes q_{m+1} and S is justified on q_{m+1}.

d: An ω-consecution for S is a function f, with the infinite domain ω of all natural numbers, such that for $m \in \omega$, $f(m)$ is a proposition q_m which S believes. Moreover, for any $m \in \omega$, S believes q_m, S is justified on q_m, S believes q_m because S believes q_{m+1}, S believes q_{m+1} and S is justified on q_{m+1}.

e: An ω-consecution is *n-cyclical*, with root r, just if r is the least number such that for all m, if $r \leq m \in \omega$, $q_m = q_{m+n}$.

f: An ω-consecution is *cyclical* just if n-cyclical with root r for some $n \in \omega$ & $r \in \omega$.

g: A tuple of propositions is a *consecution* to q_0 for S, just if it, for some ordinal number $1 < \alpha \leq \omega$, is an α-constitution to q_0 for S.

h: A belief is *prime* just if its believed has no consecution.

i: A belief is *primal* just if it is not prime, and it has a consecution which terminates with a prime belief.

j: A belief is *cyclical* just if it has an ω-consecution which is cyclical.

k: A belief is *infinitary* just if it has an ω-consecution which is not cyclical.

Prime beliefs are neither primal, cyclical nor infinitary, and some beliefs may be both primal, cyclical and infinitary, lest further restrictions are imposed. The definition of consecution, and the definition of knowledge above, have the consequence that a prime belief is known just if it is true and justified, and other true and justified beliefs are known just if they have a consecution where all succeeding propositions are known.

A variety of recursionist epistemologies may be engendered by varying restrictions upon consecutions, in addition to the different points of view which may be had by imposing conditions upon central notions of the previous section.

4 Gettier's examples

The counter examples of (Gettier, 1963), against the classical definition of knowledge as justified, true belief, are discussed in light of recursionist theories of knowledge:

4.1 Smith and Jones and the coins in the pocket

In the first example of (Gettier, 1963), Smith concludes that the one who gets the job has ten coins in his pocket, based upon the supposedly justified beliefs that Jones gets the job and that Jones has ten coins in his pocket. But Smith's belief that Jones gets the job is mistaken. Instead, it is Smith who gets the job, and, also to Smith's surprise, Smith as well has ten coins in the pocket. So Smith has a justified true belief that the one who gets the job has ten coins in the pocket, but Smith does not know that the one who gets the job has ten coins in the pocket. Recursionist theories of knowledge avoid the problematic conclusion, however, for the latter justified belief is held because Smith believes, falsely, that Jones gets the job and has ten coins in the pocket, and Smith does not, as required by Definition 3.2.1 (iv), have a belief p such that Smith believes that the one who gets the job has ten coins in the pocket because Smith believes p, and such that Smith knows p and knows that p only if the one who gets the job has ten coins in the pocket.

4.2 Smith, Jones and Brown in Barcelona

In the second example of (Gettier, 1963), Smith is justified on the false proposition that *Jones owns a Ford*, and concludes that *Jones owns a Ford or Brown is in Barcelona.* Without Smith having an inkling about Brown's whereabouts, the latter is in Barcelona. In as much as justification is closed over known entailment, Smith has a justified true belief that Jones owns a Ford or Brown is in Barcelona, but, as Gettier points out, without knowing it.

With the recursionist definition of knowledge, we need to invoke condition (iv) in Definition 3.2.1, as Smith believes and is justified on *Jones owns a Ford or Brown is in Barcelona*, and believes it `because` S believes *Jones owns a Ford.* But S does not have a belief p such that S believes *Jones owns a Ford or Brown is in Barcelona* because S believes p, and such that S knows that p and knows that p, *only if Jones owns a Ford or Brown is in Barcelona.* So the recursionist teory does not support the implausible result that S knows that *Jones owns a Ford or Brown is in Barcelona.*

5 Conclusion

As stated in the beginning, it has been an aim not to discuss other contributions to the literature, as it is too large. One will find similarities with some theories which have been proposed, but the recursionist theories are unique in being recursive.

Let *weak epistemic closure* be the principle that S knows q if S believes q, S is justified on q, S believes q because S believes p, S knows p, and knows q if p.

It seems likely that S has a Gettier style belief q only if S is justified on q and there is a belief p such that S believes q because S believes p. Moreover, it seems clear that weak epistemic closure holds. So it seems difficult to find Gettier style counter examples to recursionist theories of knowledge.

Reference

E. Gettier. Is Justified True Belief Knowledge? *Analysis*, 23(6), 1963: 121-123.