

4 Mäki's three notions of isolation

Till Grüne-Yanoff

1 Introduction

The idea that scientific theories aim to capture a small separable aspect of real-world phenomena has a long tradition in philosophy (for example in Mill, Nowak, Cartwright, or Hausman) and in economics (for example in Menger, Senior, Cairnes, or Marshall). In current philosophy of science, few have explored this idea – in the form of the concept of isolation – so thoroughly and penetratingly as Uskali Mäki. While his notion of isolation is intricately linked with his larger realist project, it has also enjoyed a life of its own: it has been used both as a descriptive and an explanatory account of scientific theorizing, as a marker of distinction between different scientific disciplines, as well as a criterion of theory appraisal.

When surveying these multiple uses, one may wonder whether they are indeed based on a single notion of isolation, or whether one can detect conceptual shifts. Clearly, Mäki intends a conceptual continuity. Yet in reaction to various criticisms, and in the pursuit of new research objectives, he has offered a number of reformulations of the isolation concept over time. It may therefore be of interest to investigate the conceptual development of Mäki's notion of isolation, and to compare and contrast the versions of isolation he has proposed over the years. This is the purpose of this chapter.

In Section 2, I investigate the main strands of Mäki's thought that led up to the concept of isolation, without explicitly mentioning it. Sections 2 to 5 examine Mäki's varying formulations of the concept of isolation, distinguishing three main notions: an essential account, a formal account, and minimal account. Although associated with papers from different times, my analysis is not so much historical but rather conceptual. The goal is to discover different aspects of isolation that Mäki stressed in his different writings, and to compare them to each other. Section 6 discusses the varying functions of these three concepts and their susceptibility to different kinds of criticism. Section 7 provides a conclusion.

2 Groundwork

From his very first publications, Mäki showed an interest in and a partiality to scientific realism, applied to the social sciences and in particular to economics.¹

1 Scientific realism is commonly viewed as the claim that the characteristic
 2 product of successful scientific research is knowledge of largely theory-
 3 independent phenomena and that such knowledge is possible (indeed actual)
 4 even in those cases in which the relevant phenomena are not, in any non-
 5 question-begging sense, observable (Boyd 2010). As such, it is both a descrip-
 6 tive and a normative metatheory of science, claiming to explain what scientist do
 7 and to prescribe what scientist should do when developing theory. Mäki was one
 8 of the first to seriously propose scientific realism as a metatheory for economics.
 9 Yet not only did he apply a given metatheory to a new discipline; rather, he
 10 sought to re-shape the metatheory in order to make it applicable.²

11 Already in 1983, when applying scientific realism to management research,
 12 he identified the basic tenets of his version of scientific realism. Beyond the epis-
 13 temological and semantic characterization of scientific realism, he added a 'spec-
 14 ific metaphysics of causation à la Rom Harre and Roy Bhaskar':

15
 16 [O]bservable phenomena should be explained as causal manifestations of
 17 some underlying generative powers or mechanisms, which are grounded in
 18 the essential nature of things. It is the task of scientific theorising to reveal
 19 this causal basis of the world.

20 (Mäki 1983: 258)

21
 22 'Underlying' must be understood here quite literally: both as forming the basis
 23 of the phenomena observable on the surface and as being hidden from superficial
 24 view. To reach these underlying powers, the empirical surface of the world must
 25 be penetrated, and the essence of things uncovered.³ Success of these two
 26 projects would be explanatory, in that it re-describes the appearance of things as
 27 what they essentially are (Mäki 1987).

28 In the light of this sentiment, it is maybe not surprising that Mäki (1989) pro-
 29 posed to distinguish the superficial realisticness of economic theories from their
 30 capture of the essential nature of things. 'Realisticness' or 'this theory should be
 31 more realistic' are demands that concern the relation of a theory to the superfi-
 32 cial appearance of things. It is used in several different meanings, including
 33 'being about reality or observables', 'being true', 'having been tested', 'being
 34 plausible', or 'being a useful approximation'. Realism, in contrast, characterizes
 35 the contents of metatheories of economics, i.e., whether economic theory refers
 36 to real properties, is true or should be true. Mäki stressed that this distinction
 37 allows for a case

38
 39 that an economic theory construed in accordance with the canons of meth-
 40 odological (and especially scientific) realism would have to be unrealistic in
 41 many ordinary senses of the word.

42 ([1989] 1993: 198)

43
 44 As an example, Mäki cited the Austrian theory of firms. Firms in the theory are
 45 idealized and simplified in many ways and hence cannot be identical with actual,

observable business firms. The theory is thus unrealistic in the common meaning of the term. But because they allegedly ‘constitute the real essence of actual business firms’, they ‘manifest themselves in a variety of observable configurations that we encounter in the actual business world’ (Mäki [1989] 1993: 205). And this, according to Mäki, makes the Austrian theory of the firm compatible with scientific realism, despite its unrealisticness.

Thus equipped with an Aristotelian essentialism, expressed as a modern realism of powers and tendencies, Mäki set out to investigate ‘how economics based on realism and explanatory ambitions would look’ (1990a: 338).⁴ This intention can be understood both in an explanatory and a prescriptive sense, yet Mäki’s next move focused on the explanatory aspect. He wanted to show that certain economic theories are correctly interpreted by scientific realism. His strategy in these studies was not historical, but rather reconstructive: he wanted to show that the relevant theories could be fruitfully subsumed under a realist metatheory, not whether the actual theory development followed the metatheory. It is in this reconstructive effort that the notion of isolation plays a central role.

3 Essential isolation

Mäki first formulated his concept of isolation in his interpretation of Carl Menger as an essentialist realist. Specifically, he argued that Menger was a realist about universals. Yet, as universals in Menger’s view are only aspects of particulars and not directly observable in pure form, they have to be ‘abstracted from the full empirical reality’ (Menger 1963: 62, quoted in Mäki 1990b: 297) through a theoretical operation. Mäki added, ‘Another term that Menger uses in this connection is “isolation”’ (ibid.). He then presented his first interpretation of isolation:

When carrying out an isolation, an economist picks out a limited set of elements in a total situation and excludes the rest from consideration. ... [T]he stronger an isolation ... the more unrealistic is the representation.

(Mäki 1990b: 293)

Specifically, Mäki interpreted Menger as explaining actual monetary phenomena by theoretically redescribing them. This redescription takes the form of a theoretical isolation of ‘certain powers, tendencies and capacities’ (1990b: 307) that are inherent in the essential nature of money.⁵ In this new-found notion of essential isolation, Mäki thus saw the method to ‘penetrate the empirical surface’ and ‘discover the true essence’ of things, as he had envisioned in his earlier comment on Marx:

In contrast to encompassing empiricism, [Mengerian realism] encourages the employment of strong isolations and abstractions in search of comprehension of what is not accessible to ordinary commonsense experience.

(1990b: 291)

1 Successful essential isolation discovers 'exact types'. Of course, essential isolation
 2 may fail, because the essential nature of an entity is not as presumed. Thus
 3 isolation is an operation leading to knowledge that is a posteriori with regard to
 4 empirical evidence. However, once the relevant exact types are determined, a
 5 theory constructed on their basis discovers 'exact laws'. 'This is at least partly
 6 ... [a derivation] from the conceptual contents of the categories we use to denote
 7 exact types. This is an *a priori* operation.' (Mäki 1997: 492). Essential isolation
 8 thus gives rise to representations of exact types, which in turn give rise to exact
 9 laws.

10 The notion of essential isolation allowed Mäki to explicate how unrealistic
 11 theories can still be true and hence compatible with scientific realism. Assuming
 12 a correspondence notion of truth, '... an isolating theory or statement is true if it
 13 correctly represents the isolated essence of the object' (Mäki 1992a: 344).⁶

14 This of course is a non-standard use of the correspondence notion of truth, as
 15 it yields the theory to be true (by resembling an isolated essence), while at the
 16 same time it is also false (in its statements about idealized entities). Conse-
 17 quently, Mäki distinguished two truth concepts, where a theory making *only* true
 18 statements expresses 'the whole truth', while a theory making true statements
 19 about the intended isolated objects is 'nothing-but-true'.

20 The notion of essential isolation further allowed Mäki to distinguish theories
 21 according to whether they support a 'realist reading' or not. By 'realist reading'
 22 he meant an interpretation of the theory as 'putatively referring to entities [and
 23 their properties] ... such that the theory has a chance of being true' (Mäki 1992b:
 24 38). The Austrian theory of the market, Mäki argued, supports such a realist
 25 reading, because it has the metaphysical character of a causal process theory. In
 26 a causal process theory, he affirmatively quoted Ellis (1985), 'the postulated
 27 causes of the phenomena must be supposed to exist if the theory is to be accepted
 28 as doing what it purports to do' (Mäki 1992b: 48). He added that 'causal process
 29 theories have been constructed for the purpose of providing accounts of the more
 30 or less detailed workings of the world' (*ibid.*).

31 Moreover, that Austrian theory of the market is an isolative theory further
 32 supports the theory's realist reading. Because it purports to be a theory of the
 33 essence of the market, and claims to be a candidate for a true representation of
 34 real powers and tendencies, the 'isolation allegedly brings [the theory] closer to
 35 the essential aspects of reality' (Mäki 1992b: 55), hence supporting a realist
 36 reading of the Austrian theory. Mäki contrasted this with Walrasian theory,
 37 which is 'difficult to construe as a theory about tendencies ... [but rather] about
 38 a possible, nonactual state' and therefore 'does not give strong support to the
 39 idea that the theory might turn out to be true' (Mäki 1992b: 54). Theories that
 40 are isolative in character thus support a realist reading, while those that are not
 41 isolative in character do not.⁷

42 The use of essential isolation as a defense of realism makes substantial onto-
 43 logical assumptions about the relation of isolating theory and parts of the real
 44 world. In particular, it claims that the factors and causal mechanisms represented
 45 by a successful isolating theory are real, in the partition that the theory proposes.

Whether one can hope to find such ontological assumptions to hold in the social realm seems largely an open question (cf. Reiss 2009).⁸ Such concerns may have motivated Mäki in the early 1990s to develop the isolation concept in a more formally characterized way, and less reliant on an essentialist ontology.⁹

4 Formal isolation

Seen from the essential account, isolation is a property that distinguishes some theories from others. As we saw in the last section, Austrian theories of the market purport to isolate the essence of the market, in the form of causal powers or tendencies; while general equilibrium theory construct counterfactual worlds that are difficult to interpret as isolating any real-world essences.

In 1994, however, Mäki claimed that ‘*any* theory is bound to isolate a small slice of the world from the rest of reality’ (Mäki 1994a: 148, *emphasis added*).¹⁰ Isolation now is understood as a basic process of scientific theorizing in general. It does not distinguish different kinds of theory anymore, but rather characterizes them all.

This new universal outlook of the isolation concept may have made the link of isolation to any ontological notions of essence impractical. The fact is that Mäki stopped using essential notions in relation to the concept of isolation in the early 1990s. Instead, isolation is now characterized as a process with procedural properties:

Theoretical or ideal isolation ... is manifest when a system, relation, process, or feature, based on an intellectual operation in constructing a concept, model or theory, is closed from the involvement or impact of some other features of the situation.

(Mäki 1992a: 325)

Thus, isolation is a *process* (of ‘closing from’) that leads from a *base* (the ‘situation’) to an isolated *product* (a ‘concept, model or theory’). These three aspects are central to the notion of isolation.

First, isolation is a *process*, an ‘intellectual operation’ that consists of ‘constructing’ and of ‘closing [off] from’. This process, Mäki suggested, is analogous to scientific experimentation. An experimenter causally intervenes in a process occurring in the world, and thus closes off the target entity from causal interferences of other entities. Yet while the experimenter causally manipulates real entities, the theoretical isolator manipulates representations (Mäki 1994a: 151).¹¹ Mäki therefore conceives of theoretical isolations as thought experiments, as opposed to laboratory experiments: ‘isolation takes place in one’s ideas, not in the real world’ (Mäki 1992a: 325).

Yet Mäki also saw the limitations of this analogy: ‘The theoretical method of isolation involves an imitation of a limited portion of the logical structure of experimental research capable of material isolation’ (Mäki 1996: 443). While they differ on ontological grounds and epistemic powers, experiments and

1 theoretical isolations share the same logical structure. But what are the proper-
 2 ties that characterize this logical structure of isolation?

3 Isolation proceeds via two procedures. The act of *omission* excludes the
 4 impact of some factors by neglecting them in the representation. The act of *ide-*
 5 *alization* distorts the impact of some factors, by changing a parameter in the rep-
 6 resentation to a different value, typically to zero or infinity. Idealization thus
 7 yields a deliberately false representation (Mäki 1992a: 324). To engage in ideali-
 8 zation requires that one represents the idealized element, and that one knows that
 9 this element could be more accurately represented – even if the exact form of
 10 this more accurate representation is not spelled out.

11 Mäki addressed the procedural aspect of isolation explicitly when discussing
 12 Ronald Coase's methodology. He interpreted Coase's rejection of the neoclassi-
 13 cal tradition as 'blackboard economics' as rejecting too high a degree of abstrac-
 14 tion. Abstraction, in Mäki's terminology, is the same as *vertical* isolation, i.e.,
 15 isolating universal aspects of things from their particular features. But Mäki
 16 observed that Coase himself employs abstractions: after all, he wrote about the
 17 nature of the firm, not the natures of particular firms. To make sense of Coase
 18 criticism, Mäki acknowledged that 'the term "abstraction" in the vertical context
 19 designates two different concepts, namely the *level of abstraction* and the
 20 *process of abstraction*' (Mäki 1998: 15).

21 In a process of abstraction, a theorist moves from detailed knowledge of par-
 22 ticular phenomena to abstract (i.e., vertically isolated) notions of these phenom-
 23 ena. Coase, Mäki noted, performed a large number of case studies on industrial
 24 structure and behavior, hence documenting the detailed knowledge from which
 25 he then derives his abstraction. This procedural aspect distinguishes Coasean
 26 methodology from neoclassical economics, which employs abstractions without
 27 arriving at them through a process of abstraction.

28 Second, isolation commences from a *base*, closing off 'the involvement or
 29 impact of some other features *of the situation*' (Mäki 1992a: 325, *emphasis*
 30 *added*). By 'base' I mean here any description of an environment that the isola-
 31 tion seeks to manipulate and control. This may be a description of the actual
 32 world. For example, Mäki interpreted Coase as first establishing case studies of
 33 real firms, and then isolating certain features from these detailed descriptions.
 34 Here, through isolation, a 'situation is simplified by removing items from the
 35 actual situation' (Mäki 2004b: 1725).

36 Alternatively, a base may be an abstractly described situation. For example,
 37 Mäki (1996) postulated the existence of three 'hypothetical levels of thought':
 38 general folk views, folk economics, and scientific economics. The entities in all
 39 three of these levels remain the same, 'entities with which economists and others
 40 are familiar on the basis of ordinary experience' (Mäki 1996: 434). Yet when
 41 moving from one level of thought to the next, descriptions of these entities are
 42 modified and rearranged. By moving from the general folk view to folk econom-
 43 ics, 'emotions are excluded in favor of rational deliberation. Making love is
 44 excluded in favor of making money' (*ibid.*: 435). By moving from folk econom-
 45 ics to scientific economics, properties of these entities are 'selected', 'abstracted',

‘idealized’, ‘projected’, or ‘aggregated’ (ibid.: 435). Thus, general folk view descriptions would be a base for folk economic isolation, and folk economics would be a base for a scientific economic isolation.

Furthermore, even within the realm of scientific economic theories, bases of isolation can be found. When discussing debates and changes in economic theorizing, Mäki (2004a) suggested that debate and change could often be reinterpreted in terms of isolation and re-isolation. Thus a critic may suggest a new theory in which the focus of isolation of a prior theory is shifted towards another feature, or in which the isolation is narrower than in the prior theory. The prior theoretical descriptions are then the bases of isolation: the new theory is developed from them by a process of omission or idealization.

Whether a description of phenomena or a theory, what is relevant is that the base has a higher degree of complexity, with the interaction of various entities, so that there is something to be isolated from. Additionally, this base must be, in some sense, represented. Isolation, as stated above, is an operation defined on representations; hence not only the result of the isolation is a representation, but also the base from which isolation starts.

Third, isolation yields a *product*, ‘a concept, model or theory’ that is appropriately isolated. In laboratory experiments, a target entity is shielded from the causal interferences of other entities, yielding a *material isolation*. Theoretical isolations, in contrast, yield a representation in which some entities are ‘sealed off’ (Mäki 1992a: 321) from the influence of everything else.

Conceptually, two kinds of isolation products can be distinguished. An abstraction is ‘a universal ... isolated from particular exemplifications’ (Mäki 1992a: 322). For example, a theorist may abstract from the linear form of the functional equation $q = a + bp$, instead choosing $q = f(p)$ for a theoretical representation. Mäki therefore calls abstraction *vertical isolation*. A *horizontal isolation*, in contrast, isolates while keeping the level of abstraction constant. For example, a theorist may isolate the influence of p on q from other influences by representing it in the form $q = f(p_1)$ instead of $q = f(p_1, p_2, p_3, \dots)$.

Mäki carefully distinguished the isolation process, which may involve idealization or omission, from the product of isolation. The process of isolation separates entities into an ‘excluded field’ (1992a: 321), consisting of those entities that are either omitted altogether or whose features have been idealized (1992a: 328), and an ‘isolated field’, consisting of entities that have not been thus treated.

The purpose of this separation is to isolate a factor F from intervening factors G_1, \dots, G_n . By idealizing or omitting the factors G_1, \dots, G_n , their influence on F is controlled or neutralized. This allows, according to Mäki, the investigation of F ‘in isolation’, i.e., in such a neutral or controlled environment. F is then a product of isolation.

Although Mäki does not spell this out fully, this implies that only the G_i s are omitted or idealized, but not the factor F itself. This way, one makes false claims about the G_i ; but the purpose of the theoretical process, i.e., to isolate the operation of F , remains intact. Idealizations, as Mäki says, are false representations

(Mäki 1992a: 328). Isolations, however, are claimed to be at least capable of being true. If they were idealized, too, they would not be capable of being true. Hence idealizations and isolations must be strictly distinct.

Consequently, idealization is a procedure applied to entities one isolates from, but not to entities that one intends to isolate; and idealization is used as an auxiliary technique in the process of isolation, although it is not part of the isolated product itself. Thus the product of isolation, i.e., the isolated factor, is never idealized.

From the procedural view, isolation is a theoretical process commencing from a base, involving omission and idealization, and resulting in an isolated factor. Because it is characterized by these formal properties, isolation is no longer associated mainly with essences. This allows Mäki to identify isolation in any theory, and even to distinguish between isolative theories that capture the essence of the object of interest and those that do not: 'The standard neoclassical isolation can be argued to divert the focus of theory away from some of the essential features of the economy' (Mäki 1994b: 250).

Instead of capturing essences, what characterizes isolations now are formal properties of theories and theory construction processes. This in turn gives a handle on how to distinguish theories by these formal properties: A 'large portion of the differences between theories', according to Mäki, 'can be traced back to their characteristic ways of employing *the method of isolation*' (Mäki 2004a: 319). Some theories satisfy the formal properties more than others, and may therefore be said to be more isolative.

5 Minimal isolation

In more recent papers Mäki has proposed the isolation account not only as a metatheory of theorizing, but as a general account of economic modeling (2005, 2006, 2009a, 2009b). Crucially, Mäki has conceived of his account as universal: *every* model is fruitfully explicated as an isolation. In particular, isolation supposedly characterizes the representational function of models, their relation to experiments, and their truth.

Mäki's MISS account (*Models as Isolations and Surrogate Systems*) distinguishes between the representative and resemblance aspects of representation, and embeds models in a pragmatic context that includes the modeler's purposes, audiences and commentary. More specifically, a model is an object used by an agent as

a representative of some target system R
for purpose P,
addressing audience E,
prompting genuine issues of resemblance to arise;
and applies commentary C to identify and align these components

(Mäki 2009b: 32)

Of these characterizing elements, the notion of representative is most relevant for the present purpose. A model is a representative of some target in the sense that it stands for that target as its *surrogate*. A model functions as a surrogate for a target in the sense that instead of seeking to acquire information about target R by examining R directly, one examines the properties of the model, thus hoping to indirectly acquire information about R.

For a model to fulfill the function of a surrogate of R, the model must resemble the target system R in suitable respects and sufficient degrees. Yet Mäki has argued that a model being a representation of R does not require resemblance. Rather ‘it only requires issues of resemblance to potentially arise’ (Mäki 2009b: 33). This requires that models have the likely capacity to resemble, and that ‘irrelevant resemblances do not count’.

Mäki has contrasted models as surrogates with models as *substitute systems*. A model is a substitute system if it does not raise issues of resemblance at all. This may be the consequence of model users focusing their attention merely on examining the properties of the model without any interest in the resemblance aspect of representation. The model then

becomes a substitute system, a freely floating subject of inquiry, unconstrained by any concern as to how it might be connected to real-world facts. It substitutes for the real system rather than serves as its surrogate.

(Mäki 2009b: 37)

Thus, the issue of resemblance is central to Mäki’s MISS account. It is here that the notion of isolation comes in, as it explains how models resemble their target systems.

Models represent the target systems as far simpler, as devoid of most of those properties and causal facts, highlighting or focusing on just a small fraction of them. I have attempted to capture this feature of models by saying (following Marshall and other economists) that they *isolate* a fragment of their target systems.

(Mäki 2006: 10, emphasis added)

The issue that the representative function of models raises is that of partial resemblance, explicated as the isolation of certain features of the target by the model. Isolation thus becomes one of the central tenets of the MISS account.

Mäki has explored the relevance of the isolation notion for the understanding of models and modeling further by suggesting an analogy between models and *experiments*. Models, he argued, are constructed to create ‘a simple and controlled mini-world in contrast to the complex and uncontrolled maxi-world’ (Mäki 2005: 306). The way they are constructed proceeds via manipulation: ‘a system of entities is manipulated in order to accomplish effective isolations of a limited set of properties and causal relations from the rest of the world’ (*ibid.*). The only difference between experiments and models lies in what exactly is manipulated.

1 While material experimentation employs causally effected controls, theoret-
 2 ical modelling uses assumptions to effect the required controls. Assump-
 3 tions are used to neutralise, in the model worlds, the involvement of other
 4 things by assuming them to be constant, absent, of zero strength, negligibly
 5 small, in a normal state, within certain intervals, and so on. . . . The structure
 6 of experimentation, involving controls and isolation, is the same, while what
 7 is different is the way these controls and isolations are effected: by way of
 8 thinking and assuming, and by way of material or causal manipulation.

9 (Mäki 2005: 398–399)

10
 11 Mäki thus drew on his earlier analogy of material experiments and theoretical
 12 isolations to characterize models. Models are a special kind of theoretical isola-
 13 tion, and modeling is a special kind of theoretical isolating.

14 Last, Mäki argued that models can be true if they are isolations. They can be
 15 true, he said, by isolating a real causal force, and showing its characteristic way
 16 of functioning (Mäki 2006: 14). This reading is further supported by another
 17 paper, where Mäki stated:

18
 19 Economists can be philosophical realists about their models even though
 20 these describe imaginary situations. . . . This is because it is possible that the
 21 mechanisms in operation in those imaginary situations are the same as, or
 22 similar to, those in operation in real situations.

23 (2009a: 79)

24
 25 The diagnosis that economists can be realists about some parts of their models
 26 clearly presupposes that these models are isolations. So Mäki embraces the view
 27 that economic models (by and large) are isolations.

28 Yet this usage of isolation does not sit easily with the formal account of isola-
 29 tion that Mäki developed throughout the 1990s. In particular, first it seems that
 30 many models are not constructed via an isolation *process*. When examining
 31 typical examples of theoretical models in economics, biology, and other model-
 32 based sciences, one typically does *not* find traces of the modeler moving from
 33 detailed knowledge of particular phenomena to isolated notions of these phe-
 34 nomena. One typically does not read about such a process in the published
 35 papers, nor hear about them in seminar presentations, nor learn about them in
 36 autobiographical material. Rather, what modelers often stress is the lack of a
 37 connection between real-world observations and the model construction process
 38 (Grüne-Yanoff 2011).

39 Second, it seems that many models are constructed without the modeler
 40 having a specific base in sight. In particular, models are often introduced without
 41 a description of an environment that the purported model isolation seeks to
 42 manipulate and control.¹² In fact, some authors have even suggested that a lack
 43 of a base from which models are isolated is a central characteristic of modeling,
 44 and hence agree with my diagnosis that models and isolations diverge in this
 45 respect (Godfrey-Smith 2006; Weisberg 2007).

It therefore seems that the notion of isolation underlying MISS is different from that which I discussed in the previous section. And indeed, in recent publications, Mäki has disavowed such a procedural understanding of isolation. Instead, he has defended the models-as-isolations account by claiming that what mattered is the product, i.e., that the model is an isolation, and not that modeling is identifiable as an isolation process from a specific base.

I take theoretical isolation to be a central characteristic of an important class of models, akin to isolation in material experiments ... What the two procedures share is the *goal* or function of closing a system by neutralising a number of factors that are not included in the isolated system. This outcome is essential for isolative modelling, while the precise *way* in which isolations are implemented is inessential.

(Mäki 2009b: 31, emphasis added)

I term this the *minimal account* of isolation, as it restricts itself to the third characteristic of the formal account. Consequently, the only substantial property that characterizes minimal isolation is that the product of isolation is never idealized. Idealization is but a procedure applied to entities one isolates from, not to entities that one intends to isolate (Mäki 1992a: 328), and idealization is used as an auxiliary technique for generating isolation, yet it is not part of isolation itself (Mäki 1992a: 325).

6 Discussion

The preceding investigation has shown that there is not one uniform concept of isolation in Mäki writings, but at least three different ones. Essential isolation is characterized by a purported ontology of the world, relating to essences, tendencies and causal processes. Formal isolation is characterized by properties of the theory construction process, involving a base, an isolation procedure, and an isolation product. Minimal isolation eschews characterization by any procedural properties, and focuses on the properties of the isolated model alone. All three concepts are therefore different in content, yet are related to some degree. While minimal isolation may be a reduced version of formal isolation, their relation to essential isolation is more distant.

Understanding these differences may be of interest by itself. But beyond that, these differences are also relevant for understanding and assessing the various functions that the isolation concepts are supposed to have. Three broad categories of functions can be distinguished in Mäki's writings.

First, isolation plays an important role in Mäki's version of scientific realism. Scientific realism comes in many guises (see Lehtinen, this volume) and it is not always clear which version Mäki has endorsed at what time. Yet it is clear that one of the core objectives of Mäki's project is to provide a convincing realistic reading of economics, in spite of its many shortcomings and obvious falsifications. Any naively realistic view that stipulates theories to represent real-world

1 entities in its every detail inevitably founders on scientific practices like that of
 2 economics. Mäki's sophisticated realism instead proposes that successful theo-
 3 ries represent parts of real objects or events: they isolate these parts, and for the
 4 purpose of this isolation deliberately omit or idealize other parts. Isolation thus
 5 is first an operation on a representation, but it also presupposes a certain onto-
 6 logical structure of the world. In particular, it presupposes that the world consists
 7 of entities in such a way that the terms of the isolating theory refers to something
 8 real; and it also presupposes that these entities instantiate properties and relations
 9 in such a way that the isolating representation can be mapped onto them. I am
 10 unsure whether such ontological commitments imply a form of essentialism. But
 11 it seems obvious to me that the essentialist notion of isolation is best suited to
 12 cope with the demands of such a project, as it makes explicit the ontological
 13 commitments of a sophisticated realism making use of the isolation concept.

14 At the same time, this commitment also makes essential isolation vulnerable
 15 to certain kinds of criticism. It raises ontological questions about whether the
 16 entities a theory refers to are necessarily real, whether there are any properties
 17 that these entities essentially have, and whether the properties that the entity
 18 does have can be partitioned in the way the isolating theory proposes. Concern-
 19 ing the first question, Sugden (2000) has argued that modeling involves con-
 20 structing and hence 'adding something' rather than merely isolating. Such
 21 constructions then yield fictions rather than isolating representations of real-
 22 world targets. Mäki (2009b: 31) has replied that isolation does not only consist
 23 in 'removing or eliminating or peeling off features' but also in adding and dis-
 24 torting features, as it uses idealization and omission to arrive at an isolation.
 25 Hence adding and distorting features seems compatible with the objective of iso-
 26 lation, and models need not be interpreted as fictions. Yet if one understands
 27 Sugden's concern as constructing and adding *entities*, and not just *features*, then
 28 Mäki's reply seems ineffective against his criticism: a model whose terms do not
 29 refer to entities in the world cannot isolate a property of a real-world entity,
 30 either.¹³

31 Concerning the questions about properties, some authors have argued that the
 32 methods of many social scientists presuppose, in order to be successful, the
 33 existence of such essential causal powers. But since the success in employing
 34 these methods is at best mixed, it would follow that the social world is not actu-
 35 ally governed by capacities (Cartwright 1989; Reiss 2009). These concerns may
 36 apply to essential isolation, but they do not apply to either formal or minimal
 37 isolation.

38 Second, isolation in Mäki's writing plays an important role in assessing sci-
 39 entific theories. It is used to compare and distinguish the quality of various theo-
 40 ries, and the methodological positions behind them. For these purposes, the
 41 isolation notion discerns various formal properties of theories: whether and how
 42 they relate to a base from which they isolate; whether and how they involve a
 43 process of isolation; and how the theory elements involved in this process are
 44 distinct from theory elements that represent the isolation product itself. The
 45 formal isolation account seems best suited for this function, as it offers a richer

set of formal requirements imposed on theories than either the essential or the minimal account.

This focus raises a different set of possible criticisms, on methodological and epistemological grounds (e.g., Lawson 1997: 234–236). For example, it could be questioned why a relation to a base (in the ways described in Section 4) makes a theory epistemically more relevant or methodologically preferable. Similar, one may wonder why a process of abstraction or isolation bestows such qualities on a theory or model.

Third, isolation plays a significant part in Mäki's project to explain the construction and use of models. For this purpose, the isolation notion must be as broad as possible, reflecting all or at least the dominant practices in modeling. It must subsume cases in which models capture the essence of their targets, as well as cases in which theories are constructed through a process of abstraction. But it must also capture cases where the model merely offers a 'possible mechanism' (Mäki 2009b: 38), and where the model is constructed neither from a base nor through an isolation process. Minimal isolation alone can satisfy this function, as neither essential nor formal isolation offer a notion universal enough to capture the variety of theorizing practices Mäki intends to incorporate here.

This focus raises yet another kind of possible criticisms. The characterization that the product of isolation is never idealized may be violated by many models, specifically by models that are considered examples of standard and even good scientific practice. One reason one may think so is because many model settings *overconstrain* the causal power of interest (Cartwright 2009). An overconstraining model includes all the assumptions necessary to isolate a factor. But beyond these assumptions, there are many more assumptions that are necessary to derive the desired result; yet they 'could not reasonably be classed as separate causes or preventatives' (Cartwright 2009: 49) of the isolated factor. Consequently, overconstraining representations are narrower than those necessary to ensure that there are independent causes at work set: 'We see a genuine exercise of the capacity but a very special case of it' (ibid.). The representation of the isolated factor is idealized to exclude certain real instantiations of it.

Another reason may be that one finds most models requiring tractability assumptions even for the workings of the very causal power one intended to isolate (Grüne-Yanoff 2011). These tractability assumptions (e.g., the random matching assumption in evolutionary game theory) may then idealize the isolating mechanism description in such a way that it does not match any actual mechanism.

7 Conclusion

In the course of his prolific career, Mäki has proposed so far not one but three concepts of isolation. These notions differ in their conceptual content, in the way they function in Mäki's philosophical projects, and in the way they are criticisable. By disentangling these three notions, I hope to have made a small step to appreciate Uskali Mäki's thought-provoking oeuvre even better.

Notes

- 1 For anyone in doubt, he wrote: 'my intuitions are strongly realist' (Mäki [1989] 1993: 212), and reconfirmed it in Mäki (2009a: 68).
- 2 Later, he would speak of a 'relativisation of realism', and investigating 'what has to be required of a scientific realism capable of accommodating economics' (Mäki 1996: 427).
- 3 Mäki expresses this sentiment very clearly in a German-language paper on the relation of Marx and scientific realism: 'Schon Marx betonte die Rolle der wissenschaftlichen Theorie beim Durchbrechen der empirischen Oberfläche und beim Aufdecken des realen Wesens der Welt' (Mäki 1984: 54).
- 4 'I adopt the perspective of an essentialist realism of an Aristotelian type when reading Menger's writing' (Mäki 1997: 476).
- 5 As in his 1983 paper, he named Harré as an inspiration of his metaphysical views on causation, specifically Harré and Madden (1975).
- 6 Note that when speaking about an 'isolated essence', Mäki refers to the way the world is partitioned, not to the way representations are isolated. Thus, he acknowledges the substantial ontological claim he is making.
- 7 In recent personal conversation, Mäki submitted that he no longer thinks this distinction of theory types tracks the distinction of consistency with realism.
- 8 See however Hoover (2001: 36) for the following argument: 'The interest of idealization is precisely that it isolates the essential, but whether something is essential is a question not of form, but of what reality is like. The danger is that without a notion of *essence*, idealization might be reduced either to a fancy name for an arbitrary selection of *ceteris paribus* conditions or to a formal nesting relationship for theories'.
- 9 Whether Mäki has rejected an essentialist position more generally remains an open question (see Lehtinen, this volume).
- 10 See also Mäki (2004a: 321): 'Every concept, model and theory is based on an isolation of a slice of the things and properties in the world to the exclusion of the rest of what there is'.
- 11 Because there are material models, theoretical isolation may consist in the manipulation of a real entity that functions as a representation. In economics, however, material models are insignificant.
- 12 The exception here may be models that are proposed as improvements upon previous models. Yet, there are plenty of cases where models are constructed without such a background; and those are the ones I am referring to here.
- 13 I am grateful for Aki Lehtinen to point this out to me. A possible example of introducing such a new entity that is not isolated from common-sense psychology is revealed preferences (see Hands, this volume).

References

- Boyd, R. (2010) 'Scientific Realism', in E.N. Zalta (ed.). *The Stanford Encyclopedia of Philosophy (Summer 2010 Edition)*, Available at <http://plato.stanford.edu/archives/sum2010/entries/scientific-realism/>.
- Cartwright, N. (1989) *Nature's Capacities and Their Measurement*, Oxford: Clarendon.
- Cartwright, N. (2009) 'If no Capacities Then No Credible Worlds', *Erkenntnis*, 70(1): 45–58.
- Ellis, B.D. (1985) 'What Science Aims to Do', in P. Churchland and C.A. Hooker (eds). *Images of Science*, Chicago: University of Chicago Press, pp. 48–74.
- Godfrey-Smith, P. (2006) 'The Strategy of Model-Based Science', *Biology and Philosophy*, 21: 725–40.

- Grüne-Yanoff, T. (2011) 'Isolation is not Characteristic of Models', *International Studies in the Philosophy of Science*, 25(2): 1–19.
- Harré, R. and Madden, E.H. (1975) *Causal powers*, Oxford: Basil Blackwell.
- Hoover, K.D. (2001) *The Methodology of Empirical Macroeconomics*, Cambridge: Cambridge University Press.
- Lawson, T. (1997) *Economics & Reality*, London and New York: Routledge.
- Mäki, U. (1983) 'How Does Scientific Realism Manage as a Metatheory of Management Research?' in *Methodology of Management and Business Research*, Helsinki: Helsinki School of Economics, pp. 257–264.
- Mäki, U. (1984) 'Wissenschaftliche Realismus: Kontroversen und Konvergenzen' ['Scientific realism: Controversies and convergencies', in German], in H.-J. Sandkühler and J. Manninen (eds). *Realismus und Dialektik*, Cologne: Pahl-Rugenstein, pp. 53–59.
- Mäki, U. (1987) 'Explanation as Redescription', in H. Holz and J. Manninen (eds). *Vom Werden des Wissens*, Cologne: Pahl-Rugenstein, pp. 109–115.
- Mäki, U. (1989 [1993]) 'On the Problem of Realism in Economics', *Ricerche Economiche*, 43: 176–98, reprinted in B. Caldwell (ed.). *The Philosophy and Methodology of Economics* (1993), Edward Elgar Publishing.
- Mäki, U. (1990a) 'Scientific realism and Austrian explanation', *Review of Political Economy* 2: 310–344.
- Mäki, U. (1990b) 'Mengerian Economics in Realist Perspective', *History of Political Economy, Annual Supplement*, 22: 289–310.
- Mäki, U. (1992a) 'On the Method of Isolation in Economics', in C. Dilworth (ed.). *Idealization IV: Intelligibility in Science*, special issue of *Poznan Studies in the Philosophy of the Sciences and the Humanities*, 26: 319–354.
- Mäki, U. (1992b) 'The Market as an Isolated Causal Process: A Metaphysical Ground for Realism', in B. Caldwell and S. Boehm (eds). *Austrian Economics: Tensions and New Developments*, Dordrecht: Kluwer, pp. 35–59.
- Mäki, U. (1994a) 'Isolation, Idealization and Truth in Economics', in B. Hamminga and N. de Marchi (eds). *Idealization in Economics*, special issue of *Poznan Studies in the Philosophy of the Sciences and the Humanities*, 38: 147–168.
- Mäki, U. (1994b) 'Reorienting the Assumptions Issue', in R. Backhouse (ed.). *New Directions in Economic Methodology*, London: Routledge, pp. 236–256.
- Mäki, U. (1996) 'Scientific Realism and Some Peculiarities of Economics', in R.S. Cohen, R. Hilpinen, and Q. Renzong (eds). *Realism and Anti-Realism in the Philosophy of Science*, *Boston Studies in the Philosophy of Science*, Dordrecht: Kluwer, pp. 425–45.
- Mäki, U. (1997) 'Universals and the *Methodenstreit*: A Reexamination of Carl Menger's Conception of Economics as an Exact Science', *Studies in History and Philosophy of Science*, 28: 475–495.
- Mäki, U. (1998) 'Is Coase a realist?' *Philosophy of the Social Sciences*, 28: 5–31.
- Mäki, U. (2004a) 'Theoretical Isolation and Explanatory Progress: Transaction cost economics and the dynamics of dispute', *Cambridge Journal of Economics*, 28(3): 319–346.
- Mäki, U. (2004b) 'Realism and the Nature of Theory: A lesson from J.H. von Thünen for economists and geographers', *Environment and Planning A* 36: 1719–1736.
- Mäki, U. (2005) 'Models are Experiments, Experiments are Models', *Journal of Economic Methodology*, 12: 303–315.
- Mäki, U. (2006) 'Remarks on Models and their Truth', *Storia del Pensiero Economico* 3: 7–19.

- 1 Mäki, U. (2009a) 'Realistic Realism about Unrealistic Models', in H. Kincaid and D.
2 Ross (eds). *Oxford Handbook Of The Philosophy Of Economics*, New York: Oxford
3 University Press, pp. 68–98.
- 4 Mäki, U. (2009b) 'MISSing the World: Models as Isolations, Representations and Cred-
5 ible Worlds', *Erkenntnis*, 70(1): 29–43.
- 6 Menger, C. (1963) *Problems of Economics and Sociology*, transl. F.J. Nock, Urbana: Uni-
7 versity of Illinois Press.
- 8 Reiss, J. (2009) 'Social Capacities', In S. Hartmann and L. Bovens (eds). *Nancy Cart-*
9 *wright's Philosophy Of Science*, London: Routledge, pp. 265–288.
- 10 Sugden, R. (2000) 'Credible Worlds: The status of theoretical model sin economics',
11 *Journal of Economic Methodology*, 7: 1–31.
- 12 Weisberg, M. (2007) 'Who is a Modeler?' *The British Journal For The Philosophy Of*
13 *Science*, 58(2): 207–233.
- 14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45

T and F Proof