Psychology, as a science, is in the business of creating and testing theories concerning mind and behavior. What generally is omitted, however, is the testing of the concepts that constitute these theories (Holzkamp, 1983a). The fundamental concepts are presupposed and derive from somewhere else, general culture. It does therefore not surprise that many psychological concepts — “consciousness,” “psyche,” “inner life,” “motivation” — played a deplorable role in the suppression of the necessity of researching the precise material forms of social psychology (Bakhtine [Volochinov], 1977; Holzkamp, 1983; Holzkamp-Osterkamp, 1978). But we cannot do good psychology without clarifying the concepts we work with (Leontjew, 1982). The realizations especially on the part of critical sociologists and critical psychologists that the pre-constructed concepts not only are found everywhere but also that these pre-constructed concepts make their way into the sciences where they tend to be reified without appropriate analysis (e.g., Smith, 1999). This is serious, because a “scientific practice that fails to question itself does not, properly speaking, know what it does … in short, it records itself without recognizing itself” (Bourdieu, 1992, p. 236). That which is investigated depends on and is embedded in the foundational concepts but the experiments are not suited to investigate the foundational concepts itself (see also the analysis Derrida, 1996, provides of the resistance of psychoanalysis to itself, its own form of analysis). The concepts that appear in the theories, therefore, resist the kind of experimental rejection that null hypotheses receive. Whence do psychology’s fundamental concepts come from? What do they entail? And are they required at all? For example, Quine (1987) does not include it in his philosophical dictionary and states that “a serious analysis of language and communication” makes “no use of the idea idea” (p. 89). Moreover, “there is no place in the theory of meaning for meaning” in the same way that “there is no place in the theory of knowledge for knowledge” (p. 131). Could we conceive of a psychology that does without the concepts idea, meaning, and knowledge or, pertinent to the present situation, the concept (of) concept?

Our "first and most pressing scientific priority … would be to take as one’s object the social work of construction of the pre-constructed object" (Bourdieu, 1992, p. 229, original emphasis). I see in Slaney and Racine’s (S&R) text an attempt to work toward such an analysis. But, because it fails to do a cultural-historical analysis and does not achieve a proper understanding of the concept of concept, I doubt that they have gotten our discipline very far. In fact, S&R themselves employ concepts that have been rejected by the very scholars that they rest their argument on, for example, Wittgenstein (1958), who has no place in his theory for the concept of
“meaning” and who attributes it to a “primitive idea of the functioning of language” or the “idea of a language more primitive than ours” (p. 34, my translation).

What we require instead is a genuine rupture – as I see them exist between the mainstream approaches to sociology, psychology, ethnography, and so on and those approaches that mark themselves apart by means of the adjective critical. Scientists have to know their objects of which they are the products themselves. The self-evident character of the concepts scientists use derives from the “fit between objective structures and subjective structures which shields them from questioning” (Bourdieu, 1992, p. 235). In the following, I therefore not only articulate the cultural-historical concept of concept but also, in so doing, employ its very method.

Given the space limitations, the approach and its conclusion cannot be but sketchy and rudimentary.

**Approaching the Concept of Concept**

The concept “concept” itself is also very closely allied with the concept of thought. To give a “definition” of it here would be easy, but would it be of any use? (Il’enkov, 1977, p. 9)

Without doubt – and even though I differ with the authors on many points and on the approach – S&R have done important work to articulate the different ways in which the concept “concept” is used in the field of psychology, including various definitions that are employed. In fact, as I was reading their text and thinking about a response, I thought that this topic deserves a book-length, trans-disciplinary treatment. Whether their work is of any use to psychologists is a matter of the field to decide – I am not a psychologist but investigate knowing and learning in everyday life. Whereas I believe their work to be an important contribution, I also think that important ways of thinking about the concept “concept” have been left out and, therewith, ways of understanding the relation of their own article with respect to all the other work that exists on the concept of “concept.”

Concept learning in psychology has been studied from the perspective of the properties that the items share that make them instances of the same concept (category) and those that they are not shared, which characterize them as different from other concepts (e.g., Bruner, Goodnow, & Austin, 1956). In their comparative study of how the concept of concept is used, S&R employ something like this approach in the attempt to better grasp the essence of the notion as used in the field. But this approach comes with a danger that has been articulated with respect to the study of another concept, value.

In that case it would simply introduce order into the notions that any shopkeeper uses, and the matter would be limited to simple “explication” of the shopkeeper’s notions about value, to a simple, pedantic enumeration of the attributes of those phenomena to which the word “value” is opposite, and no more; and the whole exercise would amount simply to clarification of the scope of the term’s applicability. (Il’enkov, 1977, p. 362)

Thus, simply sampling psychologists’ (shopkeepers’) notions and explicating them comes with the danger of constituting a pedantic enumeration of the phenomenon and its attributes.
The traditional concept of concepts is limited, however, as we can see from the following example concerning family resemblance of the kind that various authors have been employing with different names (e.g., Armstrong, Gleitman, & Gleitman, 1999; Il'enkov, 1977). In the Jones family, Jones-A and Jones-B have the properties a, b, and c in common; Jones-B shares with Jones-C the attributes b, c, and d; Jones-D and Jones-A share property a; and Jones-E and Jones-A have no attribute in common but their name. There is therefore no single attribute that all Joneses share, though any sub-sample of Joneses may have none, one, or more common attributes. The example often is used for the prototype view of concepts; much less known is the genetic view that is taken on the issue from a cultural-historical activity theoretic (also Marxist or dialectical materialist) perspective. Thus, all the Smiths might be related in a more fundamental way: If Smith-A were a parent of the others, all Smiths thereby would be related even if they had no property in common. Or we might in fact deal with several generations of Joneses. Being historically and genetically the precursor of all others, Smith-A would then constitute the universal, abstract, or general (Il'enkov, 1977). All subsequent generations are already contained as possibilities in the ancestor. Such a genetic perspective is completely absent in the account that S&R provide. In fact, the genetic approach would be appropriate to the method of the question about the concept of concept. I am thinking here about the manners in which have been analyzed (a) the birth of metaphysics and its replacement of presentation by representation following the original Greek thinkers Heraclitus, Parmenides, and Anaximander (e.g., Heidegger, 1977, 2000), (b) the historical origins of market economy and its concepts (Marx & Engels, 1968), (c) the origins of psychoanalysis and its concept of the unconscious (Henry, 1985), or (d) the evolution of literary genre that led to the present day novel forms (Bakhtin, 1981; Bakhtin/Medvedev, 1978). It may thereby turn out that with the many different ways in which psychological researchers use concepts, we are indeed confronted not with a concept of concept but with a family of concepts (concept-A, concept-B . . .). Rather than studying their overlap – which, in the limit, might be zero – their genetic and genealogical study may reveal their cultural-historical and pragmatic relations.

Despite the warning that the pre-constructed concepts are everywhere in culture (Bourdieu, 1992), S&R have not guarded themselves against this diction and have simply taken up the concept of concept as they have found it rather than investigating its historical emergence and evolution, its splitting up into multiple concepts or the splitting up into multiple senses of the same concept. Initially, concepts have their origin in everyday language and experience; some concepts eventually come to take special significance in scientific theory. This is so because “what can be thought is already organized in people’s actual activities and is given explicit expression at the level of discourse through the concept” (Smith, 1990, p. 41, original emphasis). Other concepts, once created, make their way into the everyday world where scientists find them again while forgetting that it was science injecting them there. Concepts also undergo evolution, as the ways in which they were used no longer suffices. Thus, for example, in physics we see the splitting of some concepts energy, entropy, and temperature.
Origins of the Concept Concept

A cultural-historical approach would consist in tracing the “object” through history. Shadows of such an approach appear in S&R’s text. But in contrast to the claim they make, the term concept does not originate with Plato. I would have thought that they might spend some time discussing the extended writing Kant has done in the course of his career. That is, although there is no theory of concepts, Kant (1958) provides indeed a clearly articulated account of them, as these constitute the elements of logic:

All knowledge, that is, all representations consciously related to some object are either percepts or concepts. – A percept is a single representation (repraesentat. singularis), the concept a general (repraesentat. per notas communes) or reflected representation (repraesentat. discursiva). Knowledge by means of concepts is thought (cognitio discursive). (p. 521)

From Kant’s perspective, therefore, S&R’s example of the concept two belongs to the category representationem; a concept is abstract or particular (unlike what S&R claim). Moreover, we also find Kant to have articulated the role of the collective (“per notas communes”) and a discursively reflected origin of concepts (“discursiva”). All of the classical and neo-classical concepts of concept can be led back to his definitions. These modern approaches, in essence, reproduce and give further shape to a metaphysical concept of concept. Even most of the linguistic approaches can probably be led back to Kant’s articulation – e.g., those that include a difference between words and their “meanings.”

The term “concept” derives from the French conception, which itself is an adaption of the Latin conception-em and the corresponding verb concipère, (con-, together, altogether + capère, to take) with the primary sense of “to take effectively,” “to take to oneself” (OED, 2010, conceive). The term is traced to the 14th century parallel to the fact of giving birth, become pregnant. Kant’s German Begriff has a semantically similar origin in the verb greifen, to seize, grasp, grab, take hold of. Its origins are traced to the 8th century bigrīfan, begrīfen (Pfeiffer, 1993); but its root word greifen (to grasp) is of Proto-Indo-European origin where it took the form ghreib- (same origin as to grasp, grip) and from where it made it into many languages (Pokorny, 1959/2007, pp. 457–458). In both instances, it actually constitutes the kind of metaphorical expansion – here from physical grasping to intellectual grasping – that Lakoff (1987) uses to explain the emergence and development of concepts. But the material content that later is talked about in terms of concept (Begriff) already existed for the Greek, for example, in the discussion of the relation between the general and the particular (Plato) or in the role of sensual experience to understanding (Aristotle). Together, the existing ways of thinking about thinking and the mind have lent themselves to be captured by a metaphorical extension of the experience of grasping – a process in which the mystics where of special importance (Pfeifer, 1993). Eventually, Immanuel Kant – the Logodaedalus, master artisan of the mind (Nancy, 2008) – described and theorized the concept of concept in the way that it can be found in philosophy and psychology to the present
day. For example, in the relation between concepts and representations that S&R also discuss.

For Kant (1956), “every conception must indeed be considered as a representation that is contained in an infinite multitude of different possible representations, which, therefore, comprises these under itself” (p. 73, my translation). At the same time, “no conception, as such, can be so conceived, as if it contained within itself an infinite multitude of representations” (p. 73). Concepts and conceptions clearly have their origin in the mind, which alone can be their birthplace: “in order to investigate the possibility of conceptions a priori, by looking for them in the understanding alone, as their birth-place, and analyzing the pure use of this faculty” (p. 108).

There are different kinds of concepts. All empirical and a posteriori given concepts are called experience concepts; a priori given are called notions (Ger. Notionen) (Kant, 1958, p. 523). The sources of all concepts are reflection and abstraction from the difference of things. Kant poses – and responds to – the question about the kinds of actions of mind that constitute a conception or, which is the same, produce a conception from a particular representation. He distinguishes between pure concepts (Ger. Notio, Lat. notio) and experiential concepts. A concept of notions, which exceeds the possibility of experiences, is the idea or the concept of reason. Concepts are hierarchically organized from the highest, most inclusive but also most general from which nothing is left to abstract (“conceptum summum”) to the lowest, least inclusive, but also most immediately applicable (“conceptum infimum”) (p. 528). This hierarchy can be found in theories of conceptual organization of scientific knowledge, learning, and the conceptual change (e.g., Chi, 1992); S&R also attribute such hierarchical organization as central to the concepts-as-elements-of-language approach. Every concept can be applied abstractly or concretely, realized in the English language in the distinction between a dog (in general) and the or this (specific) dog.

In sum, etymology is an important component of a fuller investigation of the concept concept, for it allows us to understand the origins of terms and which experiences they collect together (concipère). It also allows us to understand cross-language/culture comparisons, which are important as the semantic fields of equivalent concept words differ so that the concepts are not precisely equivalent (Ercikan & Roth, 2006).

The Origins of the Cultural-Historical Approach

From Idealist Dialectics and Dialectical Materialism

The German philosopher Georg F. W. Hegel not only critiqued Kant but also laid the foundations for an approach to psychology that was to emerge a little over a century later in the Soviet Union. According to Hegel (1979), we need to look at the development of the concept and how it approaches its content until such a point that no further development is possible. For Hegel, concepts arise from the concrete world rather than being something different. They are forms in which reality and Being (Ger. Sein) manifests itself and which therefore are not something relegated to
the inner life but are real processes and forms of living praxis. The concreteness of the thing and the abstractness of the associated concept – or, equivalently, the singularity of the thing and the universality of the concept – are neither pure opposites nor externalities with respect to each other. Thus, “these two contradictory extremes are not merely alongside each other but in a single unity” (p. 105). That is, concepts are concrete and inherently tied to the things that they gather: A concept and its content are identical and form a non-identical unit. It was Karl Marx who should take up this idea exemplifying it in his historical reconstruction of economy with the concept of value, a non-self-identical concept that manifests itself as use-value and exchange-value.

It is useless to seek the general determinations expressing the essence of a class, be it the human race or some other genus, in a series of the abstract, general attributes possessed by each member of the given class taken separately. The essence of human nature in general can only be brought out through a scientific, critical analysis of the “whole aggregate,” the “whole ensemble,” of man’s social and historical relations to man, through concrete investigation and understanding of the patterns within which the process of the birth and evolution both of human society as a whole and of the separate individual has taken place and is taking place. (Il’enkov, 1977, pp. 358–359)

Hegel also proposed the method for investigating concepts by following their movement from the undeveloped general form (“abstract”) to their more developed, more articulated successors (concretizations). That is, he gives rise to the idea that any good theory of conceptions has to be able to explain the emergence of the concept of concept. In this way, the matter of logic arises from the logic of matter as Marx will want it, rather than the other way around (Marx & Engels, 1976) in the way in which metaphysical philosophers and psychologists approach the problem to the present day. This, then, gives us a genetic understanding of its cultural-historical origins and transformations and its continual concretion in the particulars of everyday social exchange.

Marx would take up this agenda, for example, in his political economy (Marx & Engels, 1968). Marx begins his account with simple barter exchanges without presupposing concepts such as money, profit, land rent, and so on. He shows how the economic system emerges with its various concepts to lead to the current market conditions of his time (19th century Britain). In the early days, the concept value did not exist as such, even though silver and gold coins had become generalized measures of the worth. Marx points to the birth of the concept of value in the work of the British economist Petty and “of all science of the production, distribution, and accumulation of wealth” (Il’enkov, 1977, p. 363). Marx does not analyze the evolution in the abstract but uses the concrete case of exchanges and how they changed in the course of human history.

In the 20th century, it was left to a Soviet philosopher to articulate the basic approach that Marxist sciences generally and Marxist psychology particularly would take. Thus,

If we, adhering to a certain tradition in Logic, tend to understand by “concept” neither “sign” nor “term defined through other terms,” and not simply a “reflection of the essential or intrinsic attributes of things” (because here the meaning of the insidious
words “essential” and “intrinsic” come to the fore), but the gist of the matter, then it would be more correct, it seems to us, to limit ourselves in relation to definition rather to what has been said, and to start to consider “the gist of the matter,” to begin with abstract, simple definitions accepted as far as possible by everyone, in order to arrive at the “concrete,” or in this case at a Marxist-Leninist understanding of the essence of Logic and its concretely developed “concept.” (Il’enkov, 1977, pp. 9–10)

From Political Economy to Literary Theory and Psychology

Marx’s approach was subsequently taken up, for example, by the literary theorist and philosopher Mikhail Bakhtin, who employed a very similar approach to describing and explaining the evolution of the novel. Rather than attempting to understand the evolution of the novel form – as it appeared in late 19th and early 20th century – by looking at novels alone, he understood that a true understanding required him to look at the evolution of language generally. Each novel is only a manifestation of the language at a period of time so that the evolution of the novel is tied to and a reflection of the evolution of language more generally.

Marx also influenced “concrete human psychology” (e.g., Vygotsky, 1989), the theory of “the psychic reflection of reality by man” (Leontjew, 1982), and the “categorical founding/foundation of psychology” (Holzkamp, 1983b). This approach to psychology, in its various Western incarnations, has become associated with adjectives such as “social,” “historical,” “cultural-historical,” “socio-cultural,” and “critical.” Thus, for the father of this truly Marxist psychology, concepts are nothing other than processed perceptions and ideas. In a word, thinking is preceded by sensations, perceptions, ideas, etc., not the reverse. Even thought itself, in the sense of a higher capacity to form concepts and categories, is a product of historical development. (Vygotsky, 1989, p. 67)

We can also see that this concept of concept influences the way in which Vygotsky sees all forms of psychology related:

But the fundamental concept, the primary abstraction, so to speak, that lies at the basis of a science, determines not only the content, but also predetermines the character of the unity of the different disciplines, and through this, the way to explain the facts, i.e., the main explanatory principle of the science. (Vygotsky, 1927/1997, p. 239)

The cultural-historical approach to psychology developed in the Soviet Union gave rise to Critical Psychology (Ger. Kritische Psychologie) in Germany, which took as its task to rest research on scientifically sound foundational concepts (Ger. Grundbegriffe), which it referred to as categories (Holzkamp, 1983b). That is, Critical Psychology engages in the attempt to develop a method by means of which the foundational concepts are scientifically grounded. This approach does not have a correspondence in traditional psychology where the emergence and development of the science’s concepts does not belong to the science itself.

Critical psychologists therefore engage in the analysis of categories similar to the way in which Marx has done with the concept of value. These categories are more general than the theories – for example, the concept of “stimulus” appears in very different theories; and so does the concept of “concept,” as S&R show. Critical
Psychology therefore is not a theory or school but an attempt at a paradigmatic level to establish a set of foundational categories (Holzkamp, 1983a). This step is required because the conscious psyche is a socio-ideological fact and as such beyond the scope of any natural science (Bakhtine [Volochinov], 1977). The most fundamental commonality in all psychological approaches is the immediacy postulate, that is, the immediate dependence of behavior on the environing conditions. (Any cause-effect investigation makes this assumption.)

Cultural-historical psychology (as its descendant Critical Psychology) also promotes materialist dialectics as the approach for the construction of its basic foundational concepts. This is so because to

define a concept does not at all mean to find out the sense imparted by men to the corresponding term. To define a concept means to define the object. From the standpoint of materialism, it is one and the same thing. (Il’enkov, 1982, p. 52)

Thus, the attempt to reconstruct the human psyche at the point where intentional actions first appear, when random movements are correlated with signals and positive valuations that derive from need satisfaction (Holzkamp, 1983b; Leont’ev, 1981). It can thereby be shown that emotion becomes a valuative mechanism at both individual and collective levels that allows need satisfaction to move from the individual to the collective, distributed satisfaction of need associated with a division of labor and activity forms. Motives organize collective activities in the way that goals organize the actions of the subject. The concept of motivation becomes superfluous, because an increasing control over individual life conditions – achieved by participating in the collective control over collective life conditions – always comes with positive valuation. Such a categorical reconstruction of the human psyche therefore changes some concepts and obliterates the need for others. (For an English account of a social psychology from first principles see Roth, 2009.)

The method for constructing possible evolutionary trajectories implements a materialist dialectical approach whereby quantitative changes – e.g., change in environmental conditions – lead to qualitative changes – e.g., selection of minor existing factor to become the dominant life-determining factor (Holzkamp, 1983b). The development eventually leads to the point where, now referred to as anthropogenesis, the characteristically human life form, although having only minor influence, became an evolutionary advantage and was selected to become the dominant life form. (Not surprisingly, therefore, cultural-historical psychologists nature and culture are but different manifestations of life.)

**Cultural-Historical Approach to the Concept of Concept**

The object of psychology has to be the mental activity accomplished or in the process of accomplishing itself in relation to any extra-psychic content (Bakhtine [Volochinov], 1977). The difference between ideology and the psyche is undecidable – they are cut from the same cloth. Thus, growing up in society, we appropriate the language about concepts prior to being able to analyze it; and when we are capable of analyzing, we already are impregnated by the ideology of concepts. Vygotsky,
Il’enkov, Leont’ev, and Holzkamp refer to Marx and his concept of the concept and its development:

After the ruling thoughts are separated from the ruling individuals and above all from the conditions that emerge from a given stage of production – wherefrom emerged the result that ideas always exist in history – it is easy to abstract from the different thoughts that “the thought,” the idea, etc. rules history and to thereby comprehend the individual thoughts and concepts as “self-determinations” of the historically developing concept. (Marx & Engels, 1969, p. 48, my translation)

An important omission in S&R’s articulation of the psychological concept of concept concerns the relation of concepts to life – other than in three brief mentions that to have mastered a concept means applying it to something. In fact, as we know from the “symbol grounding problem” in the cognitive sciences (Harnad, 1990), the question of the application of concepts, which are not only transcendent but also metaphysical in nature, becomes a major issue. It is also a major issue in educational (research) practice, where scholars and teachers alike complain about students knowing a concept but not knowing to apply it. From a materialist dialectical position, however,

the whole problem of thought to reality and therefore the transition of thought language to life exists only in philosophical illusion … this great problem … hat to take the course that in the end some errant knight set out in the search of a word, which as word makes the transition in question, which as word, ceased to be merely a word, and which, as a word, in a mysterious supra-linguistic manner, points from within language to the real object that it denotes. (Marx & Engels, 1969, p. 435, my translation)

This issue returns with language, when S&R neither provide a way of relating thought and language, their preferred approach, nor of language to life. Wittgenstein (1958) – as Jacques Derrida (e.g., 1967) – is often read to mean that everything is a question of language and that there is nothing outside text. But from a pragmatic perspective (e.g., Davidson, 1986; Rorty, 1989), the difference between knowing a language (concept) and knowing one’s way around the world is undecidable. This is a very different way of expressing the issue than what the authors propose Wittgenstein to have said (as others falsely say it about Derrida). In their way, knowing a concept is equivalent to knowing what it means, that is, they propose but another referential concept of concept. For example, they suggest a child has mastered the concept “dog” when upon hearing the sound [dʊɡ] (or [ʃiɛ̃] or [ʃʊnt]) it can point to a four-legged animal DOG (CHIEN, HUND) (i.e., Kant’s application “in concreto”). But saying that the difference between world and language is undecidable is simultaneously collapsing the difference between a metaphysical conception of thought and language, on the one hand, and the material world, on the other hand. This way of presenting the issue, writing about sounds rather than “concepts,” already points to the materialist dialectical approach I prefer to take, because sounds, as hand/arm gestures, body positions, body orientations, smells, tastes, and so on all are material manifestations of life. This (human) life has given rise to consciousness as one of its manifestations. We may not therefore pry off any linguistic, conceptual, or discursive issue from material life because it
arises out of an extraverbal pragmatic situation and maintains the closest possible connection with that situation. Moreover, such discourse is directly informed by life itself and cannot be divorced from life without losing its support. (Vološinov, 1976, p. 114)

The concept of concept leads us astray by making us look for things that can be conceived as independent of material life, as something *metaphysical*, whereas anything we human do is always already grounded in this life, emerging from life. S&R avoid the question of consciousness altogether, even though what we are conscious of mediates the way in which we relate to the world (Leontjew, 1982), and even though already in Kant’s formulation, consciousness, concepts, and representation cannot be separated. The authors eschew the entire question of the relation of the individual and the collective, which, nevertheless, is important for the understanding of concepts in the first place. In my way of approaching the issue, there is nothing apart from life, there is also no inherent separation of whatever the concept of concept denotes from real everyday affairs, including those of a philosopher or psychologist even thought these people *might* thought to be dealing in ideals only (non-real, “airy-fairy” things).

There are methodological issues with accessing concepts as other aspects of thought, which, in the cultural-historical tradition, is neither directly accessible nor equal to inner speech nor directly expressed in language. Thought is a *process* that stands in a dialectical relation to speech (Vygotsky, 1986). Moreover, because no conscious act “can do without inner speech . . . every conscious act is already a social act, an act of communication” (Vološinov, 1976, p. 114). Readers will inevitably note that the absence of the entire socio-ideological dimension of cognition from S&R’s treatment. Any “concept” that a child could develop always already is social. Consciousness is not just a psychological phenomenon but it is a social phenomenon through and through (Vološinov, 1976; Vygotsky, 1986). Any categorical reconstruction of the concept of concept needs to be able to account for this inherently social nature of cognition, which at the same time is an inherently tied to material life. There are therefore good reasons for abandoning the concept of concept and to engage in a categorical reconstruction that leads us to concepts more useful in the study of human life, activity, consciousness, and other psychologically relevant phenomena.

**Conclusion**

In sum, S&R provide an interesting though limited start to a (meta-level) discussion of the *concept* concept. Believing that there is much more to be said on the topic, I begin to sketch out what contributions a cultural-historical approach could make to the categorical (foundational) reconstruction of the *concept* that takes into account the genetic and genealogical relations of the various concepts of concept.

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