

Loewenstein 1998). Finally, the mental accounting framework (Shefrin & Thaler 1988) does not fit nicely with the reciprocity principle: People borrow money even when they have money available on different (mental) accounts. By borrowing, they increase the amount they owe without increasing what others owe them. Borrowing increases the imbalance between giver and receiver, which is inconsistent with a reciprocity instinct.

My claim is that money either (1) parasitizes *only* on the receiving part of the reciprocity instinct (cf. cheater detection) or (2) parasitizes on another instinct. A candidate alternative instinct is the need for autonomy (Deci & Ryan 1985). I first present a series of human behaviors that suggest the existence of this instinct. I proceed by explaining how money might hinge on this instinct. I finish by reviewing several money phenomena that fit better with the autonomy instinct than with the reciprocity instinct.

The value of autonomy can be inferred from several human behaviors. I here define autonomy as independence from social influence. Autonomy reduces the likelihood that others can exploit the agent for their own benefits, and therefore increases survival. Is there evidence that such an instinct exists? Brehm (1966) showed that people are willing to forgo their favorite option in order to establish that they are in charge. Bown et al. (2003) showed that people prefer options that allow further freedom of choice. People also prefer a larger option set for its own sake (Suzuki 1997). Iyengar and Lepper (2000) replicated this finding but added that people are less likely to come back to the same choice situation, which suggests that choice has a cost. Together, these findings support the notion that people are willing to incur costs to preserve their freedom of choice.

How might money serve this instinct? Money may provide a buffer against dependency. In times of scarcity, poor people have to sell their labor or their bodies to survive. Rich people manage to acquire the means and the labor they need to survive. As a result, people might value money for its own sake, even in times of plenty when they cannot spend all the money they possess.

I sketch four observations suggesting that money might be a drug fitting the autonomy instinct rather than the reciprocity instinct. (1) Parents are allowed to give money to their offspring, but not vice versa. Although parent-offspring relationships become reciprocal later in life and are reciprocal in the long run (e.g., when children care for the elderly), this monetary asymmetry survives adulthood. Gaining autonomy from parents is an important step in life, which suggests that the monetary asymmetry between parents and offspring is related to the autonomy instinct. (2) Intrinsic saving motives (Wärneryd 1999) do not make much sense from a reciprocity perspective because they reduce reciprocity. Money that is not spent is removed from the social dependency network and does not build reputation in a reciprocal interaction. However, intrinsic saving motives do make sense from an autonomy perspective. Saving leads to accumulation, which increases independence. (3) Borrowing money from third parties while owning money is difficult to understand from a reciprocity perspective. In fact, borrowing increases the amount you owe others (which is aversive if reciprocity underlies behavior towards money), without increasing what others owe you. However, borrowing from third parties *distributes* social dependency and hence increases average autonomy. (4) According to the autonomy instinct, money should function as a signal of some hidden intrinsic quality of the owner. Money may signal that the owner managed to become independent from the environment. According to the reciprocity instinct, however, accumulated money should raise concern of cheating. Money reflects that the owner received more money than he gave away. Probably both evaluative reactions to wealth exist, but I found evidence only for the first one (Christopher et al. 2005).

To conclude, I submit that human's behavior in the context of money fits better with an autonomy instinct than with a reciprocity instinct. Money might reduce interpersonal dependency rather than organize interpersonal dependency.

## Individual differences, affective and social factors

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**Abstract:** The target article overestimates the power of money as a motive/incentive in order to justify trying to provide a biological theory. A great deal of the article is spent trying to force-fit other explanations into this course categorization. Lea & Webley's (L&W's) account seems to ignore systematic, individual differences, as well as the literature on many negative affective associations of money and behavioural economics, which is a cognitive account of money motivation.

The authors are to be congratulated on an interesting, innovative, and thoughtful paper on a woefully neglected topic. The understanding of how people think about and use money seems at once the concern of all disciplines and of none. Economists have been consistently wrong in asserting that money is the measure of all things but is itself unable to be measured. The everyday meaning and use of money may be a neglected topic in the behavioural sciences but that situation is thankfully changing (Furnham & Argyle 1998).

Perhaps the first point to be addressed and one that is completely overlooked in the target article is the extent to which money is a powerful motivator, particularly at work. Although both psychologists and lay persons hold the view that money is indeed a powerful motivator, the psychological research is far more sceptical about the power of money as a work incentive. Important experimental (Deci et al. 1999) and popular (Kohn 1993) literatures have demonstrated that money has paradoxical and negative effects on work motivation. In the old Herzbergian terminology, money is a hygiene factor, not a motivating factor: it prevents dissatisfaction rather than causing satisfaction. Money, in short, is over-rated as an incentive. It seems not be a powerful incentive, instinct, or motivator except under specific circumstances.

Indeed, Lea & Webley (L&W) overlook the literature which suggests that social comparison in terms of money earned is a much more important source of satisfaction and motivation than absolutes earned (Furnham & Argyle 1998). It is unclear how either Tool Theory or Drug Theory copes with that. Moreover, the literature on what people are willing to trade-off money for (e.g., time) seems at odds with either theory.

Further, there is a literature on the affective associations on money – that is, on what people associate with money (see Furnham & Argyle 1998). For money to be a positive cognitive drug one would imagine that nearly all associations would be positive. The results suggest precisely the opposite: Money is a major source of anxiety, worry, and depression for many – hardly an incentive.

It seems that L&W want to start with a powerful motive so that they can offer a novel biological or evolutionary psychological explanation and theory that parsimoniously explains the processes and mechanisms for money motivation better than all the other theories. But what is the nature of those theories? Are they any better than simple metaphors? The authors seem happy to dismiss Tool Theory as such but want to supplement it with Drug Theory. The ideas are novel but I believe the authors fail on three counts.

First, half of the target article is dedicated to showing how all the other theories in areas as diverse as classic psychoanalysis, economics, and developmental psychology can be fully accounted for by either the tool or drug metaphor. So we get many sections (Depth psychology; Cognitive development) in which, after a short description, the authors suggest that the area fits into one or other metaphor. This is woefully overplayed and often not well argued. Depth psychology is categorized as a

Drug Theory and cognitive development is categorized as a Tool Theory, yet it seems pretty simple to suggest a way in which it is the opposite way around. The authors seem far too eager to “scoop up” all the explanatory processes and mechanisms from all areas of behavioural science in terms of their two metaphors.

Second, there are many characteristics of a good theory apart from its heuristic appeal: parsimoniousness, consistency, validity, and so forth. A good theory both explains the current data and leads one to be able to derive clear testable hypotheses to verify the theory. It seems unclear as to how tool/drug theory does this. For instance, whence money pathology and the whole issue of individual differences? How does tool/drug theory explain pathological and irrational money hoarding or spending or gambling any better or differently than psychoanalysis? And what is the source of gender differences in money use (which should not be particularly problematic from an evolutionary perspective)? In short, what is the *incremental* validity of the theory/metaphor from what has gone before, or is it merely a classificatory device for all other theories in the area?

Third, the question must be asked: Is L&W's theory only one theory of why people seek out money as well as of how and when and why they save and spend it? Is the theory aiming to be a new, overarching, universalist theory of money usage which supplants all earlier “partial and inadequate” theories that ignore all important biological factors, or simply a corrective taxonomic challenge to those working in the area? I would suggest it succeeds as the latter but not the former.

## Metaphysics of money: A special case of emerging autonomy in evolving subsystems

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**Abstract:** There is “something more” to money, as this incisive review shows. The target article's shortcoming is its overextension of the “drug” metaphor as a blend of features that do not fit the rationalistic economics and behavioral psychologies summarized as tool theories, but this may be resolved by viewing money as a particular case of the more general evolutionary phenomenon of emergent subsystem autonomy.

Money is not alone. Examples of robust, “drug-like” phenomena other than money include humor and music. How did these things originate and become widespread and varied? To what degree can these pervasive human phenomena be explained in terms of exaptations or present adaptiveness? Another possible analogy to the emergence of money: How do humans come by the remarkable aptitude and brain circuitry for reading written words and passages, given that the history of writing seems to be only several thousand years old?

When a fleeting occurrence in living systems repeats itself, and then becomes frequent and widespread, it may achieve its own “entification” or “thinghood.” Entification entails further opportunities to accumulate additional *raison d'être*. Sufficient robustness may then be achieved to abet new evolutionary branches, and proliferation of forms. Gradually increasing autonomy in subsystems of complex systems (either living or engineered by humans) is a much more general phenomenon than is captured by Allport's personality theory principle of “functional autonomy,” which Lea & Webley (L&W) cite (target article, sect. 3.2.3; Allport 1937).<sup>1</sup> This crucial aspect of complex systems (Glassman 1973; Glassman & Wimsatt 1984; Simon 1996) underlies the fact that every evolved entity or feature of every living system originates as something else.

The biological and social living world is always in motion. Features that had served a particular function within one

species of complex system, come to serve other functions in descendants of that system, while still retaining sufficient resemblance to their precursors to be recognizable as homologs. There are innumerable examples. Engineering examples include the modification and reuse of subroutines in the development of computer programs (perhaps especially “object-oriented” programs; e.g., Kehtarnavaz & Kim 2005), and the “evolution” of large buildings and bridges (Petroski 1985). Natural examples include the evolution of the human hand and the bird's wing from the primordial vertebrate forelimb; also, the evolution of innate components of behavior, such as the patterns of rhythm-generating circuitry in the spinal cord that serve swimming in fishes and walking in terrestrial animals, and the emotions underlying greeting behavior in diverse species of social animals. Enhanced depth perception, attending overlapping binocular visual fields, is another robust phenomenon with diverse uses; it serves largely to increase the accuracy of traveling among tree limbs by monkeys and the accuracy of predatory pouncing by cats. For only the past 100 years or so, this complex neurobiological apparatus has been subject to a new form of natural selection, as humans try to accurately drive cars at highway speeds, and often live to tell the tale.

Related to emerging autonomy, the concept of “modularity” is widely used in present-day biological and social theorizing. This concept is now also deeply rooted in cognitive science theorizing, whose beginnings, circa the 1960s, happen to be coincident with those of evolutionary grand theories. However, typical uses of the concept of modularity do not sufficiently capture the degree of autonomy of evolving subsystems. Money, for example, virtually has a life of its own. L&W note that it has quickly taken root in every society that has discovered it. The ferment of multiple ongoing changes in every complex evolving system means that even when none of these dynamics is internal to a particular subsystem, the subsystem's buffeting about among other subsystems is tantamount to a process of “seeking.” This point, approximately the same insight that led Darwin to use the term “natural selection,” has been explained particularly well by Donald T. Campbell in his works on evolutionary epistemology. Campbell discusses the ubiquity of “unjustified variation and selective retention,” or “blind variation and selective retention” (Campbell 1974a; 1974b; Kim 2001). I would push L&W's history of the origins of biological “grand theories of everything” to earlier in the mid-twentieth century, certainly at least as far back as E. O. Wilson's grand tome *Sociobiology* (Wilson 1975), which, by the time of Dawkins' *The Selfish Gene* (Dawkins 1976; cf. target article, sect. 1.1), was in its fourth printing. Campbell (1976) announced it vigorously in his presidential address to the American Psychological Association.

L&W provide some important examples from ethology (sect. 2.2.2), but their use of these examples, particularly in regard to dishonest signaling, parasitism, and other “drug-like” phenomena, seems inherently conservative in its emphasis on a seamy side of evolution. L&W also cite Thorstein Veblen (1899), who offered a delightfully droll and cynical view of the seamy side of the social evolution of uses of wealth, while describing the sheer, showy nuttiness of some of those familiar uses (also see Brooks 1981). But new evolutionary branches may also be “good” ones. Yes, human archetypes are often exploited in advertising or for other selfish ends; however, they are exploited as well in great literature, which helps its human consumers to better orient themselves and to find new adaptations as they face civilization and its discontents.

Citing Campbell, Konrad Lorenz perceptively argued that a high degree of subsystem autonomy, coupled with internally generated spontaneity, is crucial in any living system, for reliability and continued survival (Lorenz 1969; Eibl-Eibesfeldt 1970). It is unfortunate that the more speculative aspects of Lorenz's work elicited polemics that have led to the neglect of many of his ideas by English-speaking behavioral scientists. For example, Lorenz compellingly explains the vital importance of