about money is its cultural dominance: it is taken up irresistibly by any human society that encounters it. Other equally functional social inventions are much less immediately attractive. In both developed and less-developed countries, governments have to engage in extensive and expensive promotional campaigns to get beneficial health, education, or birth control practices widely adopted, because those practices are not so readily compatible with human instincts and therefore with perceived immediate self-interest.

A prediction follows from this analysis. If, in the future, money is presented in forms that fit less well with the instinctual structure of the human brain, it may be a less effective tool. An obvious example is the representation of money by abstractions such as the totals in bank or credit card accounts, or the amounts in microchips on smart cards. Such abstractions would not stimulate humans' instincts towards object play, and therefore our management of them will not benefit from our early learning, through play, of how to manage objects effectively. It is consistent with this view that each new form of money seems to bring in horror stories of people who cannot control their spending with it (see Prelec & Simester 2001; Schor 1998). Our argument, therefore, is that if money had not been an effective drug, it might never have emerged as an efficient tool. It is because it is both tool and drug that it is such a strong incentive.

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Open Peer Commentary

The biology of the interest in money

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Abstract: Why are people interested in money? This question is too broad: there are many kinds of money, interest, and people. The biological approach of Lea & Webley (L&W) makes them seek the roots of this interest, and they contend that tool making and addiction qualify as the roots. Curiosity and the quest for power, however, qualify too. As L&W rightly admit, other approaches supplement their biological one.

Lea & Webley (L&W) ask "Why are people interested in money?" They expand on the concepts of "people," "interest," and "money," but these are too broad for their concern. They mention different kinds of money, from unfamiliar primitive kinds to plastic money, only to ignore the differences between them. In its diverse manifestations, money reflects a variety of phenomena rooted in diverse aspects of diverse societies. These are of no interest to L&W. Looking for the universally human, biological roots of the interest in money (no matter what counts as roots and why), they deliberately overlook social diversity. They center only on consumers' attitudes towards money. And, when they refer to people, they exclude those who do not know what money is, or who live in small communities or communes, or who are otherworldly. Thus, L&W set the scene for discussion of their question sufficiently narrowly so as to lead to their biological, universalistic answer. Are leading questions permissible in research? It depends on how interesting the discussion is.

The program of L&W is acceptable, then, on the condition that we remember that their question is set towards a biological bias, leaving the sociological and psychological biases for another day. It is an error to claim more than that, in line with the "grand theory of everything," in what is known as intellectual imperialism (the claim that only one approach fits). L&W agree: they stress in the opening of their article that a "biological" approach (involving "selective advantage") "is not an alternative to social and cultural factors as a kind of explanation" (sect. 1.1; see Agassi [1977], pp. 184, 281, 320, and 326). So they merely sketch a few alternative theories – psychological, cultural, economic – that they legitimately put aside.

Let me go along with the attitude of L&W and follow the bias that leads them to seek the biological roots of the attraction of money. They take for granted that what comprises such biological roots is conduct, specifically the use of tools and of drugs. They view money, first, as a tool (for those who intend to use it) and, second, as a drug (for misers and for those who play with money in the widest sense that includes all sorts of social games). The tool that money is, however, is a means for the acquisition of other tools – all those goods and services that are on the market for sale. Hence, money always denotes sets of options that are available for sale on the market. It is these options, and not the money itself, that most people desire. This desire – for a range of options as wide as possible – has deeper biological roots than money. Nor is "interest" the same as attraction: people in the capacity of researchers, including L&W, have an interest in money different from what they have as consumers, as do entrepreneurs, politicians, economists, economic journalists, gossip columnists, and so forth. So we should include curiosity among our root biological drives. As to the idea of money as a drug, L&W use the word "drug" loosely, and include pornography as a drug though it usually functions otherwise. Some people use pornography – and any other item that stands for sex – as sex objects proper, in a kind of fixation on them, as a diversion of the sex drive from the normal sex object. These (and other fixations) are then often called (inadequately) fetishes. And fixation is nearer to biological roots than addiction. (Addiction is a fixation of sorts.) In addition, money helps in the acquisition of power and other abstract qualities that are not commodities on the market. And the desire for power or the wish to lead others is generally deemed as having deep biological roots. Perhaps.

What good are facts? The "drug" value of money as an exemplar of all non-instrumental value

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Abstract: An emotional value for money is clearly demonstrable beyond its value for getting goods, but this value need not be ascribed to human preparedness for altruism or play. Emotion is a motivated process, and our temptation to "overgraze" positive emotions selects for emotional patterns that are paced by adequately rare occasions. As a much-

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competed-for tool, money makes an excellent occasion for emotional reward – a prize with value beyond its tool value – but this is true also of the other facts by which we pace our emotions.

Lea & Webley (L&W) demonstrate well that money is often valued for more than what it can buy. Among other things the target article should warn experimental psychologists that when they reward their subjects with money, the rewards have two components: the value of possible purchases, which are necessarily delayed, and an emotion attached to acquisition, which is immediate and imperfectly correlated with the amount and timing of possible purchases. L&W have documented many situations in which money takes on value beyond that of its potential to be exchanged for goods. They point out that this value comes from emotion, and they liken it to that of "being emotionally engaged by many kinds of text" (sect. 2.2.3). In doing so, they have identified a gap in motivational theory, a gap which, I argue, affects far more than the theory of money. Since social constructivists have pointed out the extensive role of motivation in determining those beliefs that are not shaped by the risk of failure, it has been unclear what distinguishes belief from make-believe, and texts[1] that can support belief (which get called facts) from texts that cannot. From the question of how money takes on value beyond its tool value it is a short jump to ask how any facts that do not help you get goods or avoid "bads" – *non-instrumental* facts, those that are not tools – are worth attending to. And after that, what about text that is not factual at all – pornography to be sure, but also fiction in general? I agree that text is valuable beyond its instrumental usefulness insofar as it is emotionally engaging. I agree also that conventional motivational theory lacks a rationale for this engagement, not just for the case of money, but for all non-instrumental texts.

The authors look for specific underlying instincts that might be energizing money's drug effects. ("Drug Theory is feeble unless we can we specify what the natural incentives are that money mimics"; sect. 5.1, para. 4) This search seems unnecessarily specific, like the early behaviorists' attempts to trace each emotion to a conditioning experience (Watson 1924). Nor does the authors' suggestion that money in its drug mode provides "the illusory fulfillment of the human instincts for reciprocal altruism and object play" (sect. 5.4) stand up well in application to their own list of the anomalies that make drug theory necessary: What is it about reciprocal altruism or object play that should make coins appear larger than they are, nominal values be impervious to changes in real purchasing power, new forms be unwelcome, or the purchase of some social relationships be taboo? All that these two instincts supply is a nonspecific rationale for the value of money to have an emotional component, and this can be done at a more general level.

I have suggested that, instrumentality aside, the usefulness of externally supplied texts comes from their pacing the consumption of emotional reward; the usefulness of factuality comes from its selecting adequately rare texts for this purpose (Ainslie 2001, pp 175–79; 2005). The motivational power of money-as-drug is then an especially potent example of the power conferred by factuality itself. To briefly summarize the theoretical background: Emotion is well known to be a strong motivator, but there is also substantial evidence that emotion is itself motivated. Granted that emotions are only marginally voluntary, the voluntary control that is possible argues for their motivational basis, for their being selected by expected reward rather than elicited peremptorily by trigger stimuli. However, the lack of a rationale for how a process that both motivates and is itself motivated can avoid collapsing into positive feedback has confined us to the theory that emotions are unmotivated responses to external turnkeys (Ainslie 2001, pp. 65–70, 164–71). Why not pig out on positive emotions and simply withhold negative ones? The answers to these questions reveal a motivational role for events that do not necessarily have either instrumental value or a connection to an innate instinct.

It has now been widely reported that there is a basic tendency to discount delayed reward in a hyperbolic rather than an exponential curve (Green & Myerson 2004; Kirby 1997). This lets us conceive of emotions as rewarded processes, with positive feedback restrained as follows: An occasion for negative emotion offers an immediate reward for participating in it, but the prospect of its brief reward lasts only long enough to seduce; it is experienced not as pleasure but as an urge. The dynamic I propose is the same as that for a binge, except that each cycle of seductive high and non-rewarding hangover is condensed into the fraction of a second (Ainslie 2001, pp. 51–61; 2005). For an acrophobic on a cliffside path, say, each moment of giving in to the urge to panic is followed not by relief but by a renewal of the urge, and by a growing inhibition of all other sources of reward.

But L&W are talking about a positive drug effect. If positive emotions are indulged in ad lib they become attenuated into mere daydreams through habituation. This process cannot be controlled voluntarily because of the hyperbolically weighted overvaluation of small, immediate satisfactions relative to larger, delayed ones. As a result, only patterns of generating emotions in the presence of adequately rare occasions remain robust. This contingency creates the familiar gambles that seem to govern our positive emotions: Feats in sporting events, news items, objects of collection, and, notoriously, victories in romance incite feelings in proportion to their perceived rarity. The rarity factor is what makes factuality important: Texts that qualify as facts (by any stringent selective process, including communal folklore) are more potent than a story, and the facts we have reason to seek are more potent than facts in general. In this manner, instrumentality, the value of facts for getting other goals, confusingly becomes a source of non-instrumental value. Gambling for money has more kick than gambling for points, even when we gamble for money purely as recreation. In the United States, at least, the variability of gasoline prices among stations makes the search for cheaper gas a challenging game; several acquaintances have admitted to a temptation to drive uneconomically far out of their way just for the sensation of winning at this game, even though they would not be playing it if it did not ostensibly save them money. Once we authenticate money as a prize, it becomes a tool for occasioning emotion; that is, it becomes a drug.

Some of money's drug value may come from how it fits into specific hardwired preparednesses, among them not only L&W's altruism and playfulness but also competing, gloating, envying, and especially hoarding. But all that is necessary to give money emotional power is for it to serve as a sufficiently hard-to-get goal that is set apart from equally hard but arbitrary goals by its peerless tool value. As a tool it has many uses, but that very fact makes it a unique pacing device in our quest for positive emotions per se. When a currency loses its tool value it loses its uniqueness and hence its pacing value, but this usually occurs, as the authors point out (sect. 4.3), after a lag. When McClure et al.'s (2004) subjects won an "immediate" Internet token, they consumed the prize emotionally on the spot, even though the token as tool would take some days to provide a "reward." There are many situations where tool and drug value are clearly separable, not the least of which arises when income becomes so predictable that it loses its value as an emotional prize even though its tool value remains unchanged (Ainslie 2003). But the "drug" value of money does not differ in kind from the emotional pacing value of anything else that has some claim to be a prize.

NOTES

1. An irreplaceable term, despite abuse by deconstructionists, for patterns of information that might or might not be factual.