

authors, that of playground exchanges of toys, confirms a desire of desire interpretation much more convincingly than it does a “trading instinct” hypothesis of a drug-like nature, as it is the simple fact that another child holds an object that makes it desirable for a second one.

As for the Darwinian fitness advantage that money confers, subjects who are admired extend the range of their potential partners, gaining access in particular to those who are themselves objects of admiration. The overall benefit of admiration is fitness or reproductive advantage. Cash is a universal tool to this aim. In other words, the psychological function of money turns out to be precisely what the popular press assumes it to be.

Operant contingencies and “near-money”

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Abstract: We make two major comments. First, negative reinforcement contingencies may generate some apparent “drug-like” aspects of money motivation, and the operant account, properly construed, is both a tool and drug theory. Second, according to Lea & Webley (L&W), one might expect that “near-money,” such as frequent-flyer miles, should have a stronger drug and a weaker tool aspect than regular money. Available evidence agrees with this prediction.

Lea & Webley (L&W) describe an interesting and provocative framework for the analysis of money-related behaviour. Their goal is to provide a biological account of money motivation, and they claim that, if their attempt fails, the alternative would be a purely cultural explanation. But they overlook the role of conditioning and learning processes that operate within an individual’s lifetime. An operant theory of money, properly construed, may be difficult to distinguish from L&W’s drug/tool theory, although money-related behaviour is so varied and complex that all three levels – biological, individual learning, and cultural – are probably necessary for a full understanding.

In their discussion of the operant theory, L&W do not mention the role of negative reinforcement or avoidance contingencies. It is well known that avoidance responding is highly resistant to extinction; dogs that learn to jump over a hurdle in a shuttlebox to avoid an electric shock continue to respond vigorously long after the shocks have been discontinued (Solomon et al. 1953). Neo-liberal economic reforms that create “incentives” to work by reducing social welfare expenditure can be viewed, at least in part, as massive avoidance contingencies. Thus, it is possible that some apparent “drug-like” effects of money, such as workaholic, reflect the resistance to extinction of responding maintained by negative reinforcement. Although the aversive event – joblessness, poverty – may never be experienced, the workaholic individual, like the unfortunate dogs in Solomon et al.’s experiment, lives in fear of an unhappy future.

According to L&W, traditional operant theory, based on the idea that money functions as a conditioned reinforcer, is a “pure Drug Theory” (target article, sect. 3.2.2). But it has long been recognized that stimuli that function as conditioned reinforcers have discriminative as well as reinforcing (i.e., hedonic) properties (Rachlin 1976). For example, a keylight that signals transition from a lower- to a higher-valued situation in terms of reward rate comes to act as a conditioned reinforcer for pigeons (i.e., discriminative function; Baum 1974a). And recent research has found that single dopamine neurons show a spike in activation following the onset of a stimulus that predicts subsequent reward that is similar to the spike following the reward itself. This phenomenon provides neurophysiological support for the traditional view, dating back at least to Pavlov (1927), that conditioned stimuli have hedonic value (Fiorillo et al. 2003; see Schultz [2004] for

review). Therefore, the operant account is not easily categorized as either a tool or drug theory, because it combines aspects of both. Moreover, because the tool/drug distinction is closely analogous to that between the discriminative and hedonic properties of conditioned reinforcers, ultimately it may be difficult to distinguish L&W’s account from the operant theory.

Nevertheless, we outline one approach to testing L&W’s theory, and show that some existing data are consistent with it. We are not attempting to distinguish their account from the operant theory, but rather to test the idea that money has both tool and drug properties.

Money is understood to resemble a drug with “the idea of a drug as a deceiver” (sect. 2.2.4). The implication is that, insofar as money operates as a drug rather than a tool for a particular individual or in a particular situation, it will be overvalued, in the same way that, for example, the taste of saccharin promises a food value that it does not actually have (sects. 2.2.2, 5.2). Misers can be thought to fall victim to this deception (sect. 4.10); however, as a general test of the theory, misers are unsatisfactory since their behaviour is counterbalanced by that of spend-thrifts, who, in the eyes of most of us, do not attach sufficient value to money. Is there any phenomenon that suggests that the average person might generally overvalue money?

One approach is to examine the way that people value “near-money” (the phrase is from Lea et al. 1987, p. 328). Near-money, like primitive money, is a currency that can be used to buy a limited variety of services. One prominent example of near-money in Western societies is frequent-flyer miles. Frequent-flyer miles have many of the attributes of money and, indeed, airlines often set up “accounts” for their customers. We suggest that, in terms of L&W’s theory, frequent flyer schemes are set up so as to retain as much as possible of the drug nature of money, while having rather little (although still some) of its tool nature. Given this assumption, we would expect to find even more overvaluation of a near-money such as frequent-flyer miles than of regular money. Or, alternatively, because of this greater drug component, near-money should be overvalued relative to regular money.

This possibility has not been rigorously researched, but two recent studies have produced results suggesting it might be true. Liston-Heyes (2002) found that respondents in the United Kingdom were willing to pay more for 100 air miles (about 23 pound sterling) than the air miles were apparently worth (around 7 to 12 pound sterling). Kemp (2005) found New Zealand respondents were willing to pay a median NZ \$50 for 1,000 Air New Zealand frequent-flyer points. Estimates of the real cost of these were NZ \$12.50 (based on cheap ticket cost) and NZ \$3.61 (Air New Zealand company estimate of the marginal cost). Moreover, members of frequent-flyer programs were willing to pay more than non-members (median = \$20), as might be predicted from the drug theory.

Thus, at least one independent test of L&W’s tool/drug theory seems to support it.

Show me the status: Money as a kind of currency

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Abstract: Currencies that are recognized as money cannot be easily distinguished from alternative currencies such as status. Numerous examples demonstrate the need for status to be recognized as a motivator alongside, at least, money. Lea & Webley (L&W) acknowledge the roles of status; however, a closer focus is warranted.

To the extent that we can commonly recognize “money,” we can also agree that it is not a category that is carved at Nature’s joints. Although Lea & Webley (L&W) acknowledge some examples, it is worth clear recognition that money coexists as a currency alongside a range of alternatives that includes meat, frequent-flyer miles, collectibles (e.g., special coins or clothing), and status. Indeed, the way in which frequent customers of airline and hotel companies are recognized with redeemable credits that can accompany “elite” (or “gold,” “silver,” or “platinum”) “status” provides an entertaining juxtaposition of currencies.

Illustrative of the reasons why money and other currencies need to be considered alongside each other, Frank (1985) notes that people who work closely with others often appear willing to make trade-offs between salaries and status. Frank reports a pattern of within-firm salaries in relatively interactive or social organizations where high-performers are paid less – and low-performers are paid more – than would be predicted by traditional economic, pay-for-performance models. Frank concludes that (1) high-performing individuals who work closely with peers accept lower-than-predicted salaries in exchange for higher within-firm status while (2) lower-performing co-workers endure lower within-firm status in exchange for higher-than-predicted salaries. This notion that people can buy and sell status is similarly illustrated by the willingness of hotel and airline “frequent-users” to narrow their shopping of competitors and sometimes pay above-competitor prices and consume more in pursuit of increased “status.” Loyalty programs, in general, rely on this incentive to build their associated businesses.

Adopting one of L&W’s models, status has many “drug”-like features and, in fact, has been shown to affect individuals’ biochemistry. When considering the evolutionary basis, or origin, for their Drug theory, L&W accept that “trade could be a human instinct on which the money motive might be built” (sect. 5.2). While the authors’ recognition of the social nature of commerce (and childhood play) is interesting and relevant, it is also true that *status* could be a human instinct on which the money motive might be built. Research showing drug-like changes in human biochemistry after changes in status (e.g., Mazur & Booth 1998) provides material support for this argument.

More consequentially in the genetic domain, Smith (2004) shows that relatively successful hunters in hunter-gatherer communities tend to have relatively greater reproductive fitness. Similar to L&W’s observation that “we cannot reasonably talk about a ‘money instinct’” (sect. 1.4), it would be incorrect to infer from Smith’s findings that hunter-gatherers have an instinct for dead animals. Instead, it is helpful to recognize the fact that status can motivate individuals (e.g., to be among the best hunters) and, when acquired in sufficient quantities, relatively high status can translate into material benefits (e.g., relatively high reproductive fitness).

L&W ably show that money cannot be reduced to some universally liquid currency of status; however, the use of money can, and should, be recognized in large part as a consequence of individual “status instincts.” Predictably, just as money, meat, and furs carry different values across individuals, we should expect variation among individuals with regard to the importance of personal status. Schwartz et al. (2002) report a series of studies in which they find individuals vary according to whether they tend to be “maximizers” or “satisficers.” Maximizers strive to be the best, to complete perfect projects, and get the best deal, while satisficers are more easily accommodated and less demanding of themselves and others. This dimension of individual differences might profitably guide future research on money as drug or tool.

Good examples of the importance of status regularly originate with professional athletes since their contract negotiations are so deeply open to media coverage. When professional athletes who are already earning millions of dollars and are dominant members of their team argue that they are underpaid, they and

their agents are staking claims on the need for maximized status (independent of how closely they consider their relationships with teammates). The leapfrogging that happens in this and other contemporary environments (Gerhart & Rynes 2003) is driven in part by a concern for status in which salary is interpreted as a reflection of one’s relative standing. In the movie *Jerry Maguire* (Brooks et al. 1996), when a dominant football player and his sports agent celebrate their goal of a superior contract and exclaim “Show me the money!,” they might as well be shouting “Show me the status.” L&W acknowledge the roles of status in parts of their paper; however, (1) the distinction between money and status cannot be neatly made, and (2) the importance of concerns about status over the course of human evolution warrants closer focus.

Sacredness in an experimental chamber

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Abstract: I focus on the problem of whether a specific biologic basis exists for reinforcing the power of money. I argue in favor of its existence based on a new interpretation of data obtained in experiments with pigeons and rats in an experimental chamber. The experiments demonstrated that in the animals’ behavior we can observe some features that had been considered pertinent to human beings only, such as making certain sources of utility “sacred.”

We all know cases in which people agree to receive lower payment for work related to higher values than for equal work unrelated to such values. For example, a person requires smaller salary for participation in building a cathedral, than in commercial construction. Thus, some “agencies” where a person exchanges his labor for money possess a special quality that will be called *sacredness* (Lefebvre 2003). A person agrees to work for these agencies for smaller reward than for other agencies. Something similar can be observed in the behavior of rats and pigeons

Experiments with rats and pigeons were conducted in a chamber with two pedals (left and right keys), each connected to its own food-hopper from which food bits were distributed according to a special schedule (Baum 1974b). Animals were studied individually in a series of sessions; in each session a schedule of reinforcement was fixed for the pedals. An important detail is that the frequency of reinforcements could be regulated by the animal itself by means of multiple pushes on the pedals. In analyzing the animal behavior in the experimental chamber, we use the metaphor of an “agency”: the left key with its food-hopper being the first agency, the right key with its food-hopper being the second agency. The animal behavior consisted of “addressing the agencies” and performing “work” by pushing a pedal, and this was reinforced with a scarce food supply.

For a time it seemed that in these experiments the animals chose a specific line of behavior which is described by the Generalized Matching Law (Baum 1974b), but recently Baum put forth a hypothesis that this law only approximately describes the behavior of animals and in reality there are two different behavioral patterns (Baum 2002). Analysis of these patterns allows us to suppose that in each session the alternatives (pushing a left or a right pedal) were polarized by the animal’s cognitive system, and one of them started playing the role of the positive agency, and the other that of the negative one. By using the reflexive model of bipolar choice (Lefebvre 2004) we obtain the following correlation describing the behavior of the animals:

$$N_2/N_1 = \exp(-S)n_2/n_1, \quad (1)$$