19 Commentary and Discussion on Imitation and Culture

19.1 Not Waving but Drowning
Susan Brison on Dijksterhuis

Dijksterhuis claims that imitation of others' behavior "constitutes the 'social glue' that makes us successful social animals" and that imitation is "default social behavior," something we do automatically and frequently (vol. 2, ch. 9, p. 208). The research of Meltzoff and Moore (1977, 1997) is taken to support the claim that our capacity to imitate is innate, and the discovery of mirror neurons that discharge both when an action is perceived and when it is performed (Gallese et al., 1996; Rizzolatti et al., 1996a) is taken to provide the neurological explanation for this capacity.

The claim that in social perception we imitate what we perceive sounds straightforward enough. But *what* do we perceive? According to Dijksterhuis, we perceive three different classes of things, distinguished by three different methods by which we perceive them:

1. behaviors (or actions) "that can be observed literally and directly," including "facial expressions, postures, gestures, and . . . tone of voice" (p. 212).
2. traits that we perceive indirectly but automatically through inferences based on the observed behavior of others; and
3. stereotypes, or representations that are automatically activated because of the (perceived?) social group membership of the person(s) observed.

The perception of traits and stereotypes, while considered to be automatic (which I take to mean that they are not under the conscious control of the perceiver), is viewed as decidedly more complex than the simple perception of actions. However, the perception of actions is not as simple as Dijksterhuis suggests, and it is not clear that a strictly "literal" perception of an action is possible. Actions have meanings, just as words have meanings, and they are all subject to interpretation. Two (or more) actions

can function as something like homonyms (they look exactly the same, but they have different meanings), as illustrated in the spare, evocative title of Stevie Smith's poem "Not Waving, but Drowning." In social perceptions, we frequently need to rely on inferences (about the inner states of the person observed, about the context) in order to know what behavior it is that we are perceiving—and in order to imitate it. If I wave back at a drowning person, have I imitated her? Perhaps, in a sense, but certainly not in a way that facilitates affiliation or empathy. In waving back, I am doing something similar to what I perceive her doing, but I am also doing something (disastrously) different. Suppose I realize that she's drowning and I either don't care or actually want her to drown and so I "wave back." This is now a different action and one in which I am intentionally *not* imitating the person I perceive to be drowning. In all of these cases, the drowning person and I are doing, physically, the same thing in flailing our arms, but we are performing actions with very different meanings—meanings that are not automatically or directly apparent to an observer.

Not only gestures, but also facial expressions, postures, and vocal inflections require contextualized interpretation. I am told that I look like I am frowning when I am not frowning, but concentrating. When I tell my husband, who is hunched over with his arms tightly crossed, that he looks clenched, he says he's not clenching, but freezing. Sometimes, when my son is on the verge of melting down, I think he is crying when in fact he is laughing (and vice versa).

One could imagine the case of a long-married couple whose facial expressions have come to resemble each other's, but not because they were experiencing the same emotions and literally imitating each other. One could develop the facial lines of a scowl as a result of a lifetime of "imitating" a myopic partner who was not scowling but squinting. Would it be correct to call what led to this facial resemblance "imitation"? Not if imitation implies empathy, as Dijksterhuis maintains. Just as actions, including gestures and expressions, are *intentional* only under some descriptions and not others, it seems actions are *imitative* only under some descriptions and not others. It is not clear to me how the research on mirror neurons might account for this.

None of this, however, undermines Dijksterhuis' main thesis that imitation functions as social glue, but it does suggest that the imitation of even simple behaviors is not as simple and automatic as he claims. What Dijksterhuis calls "the low road to imitation"—"literally and directly" observing an action and then imitating it (p. 212)—does not seem to be a busy

thoroughfare, or even the road less traveled, but rather one that does not exist at all. What Dijksterhuis calls "the high road to imitation"—the complex, contextualized, and meaning-laden process by which we perceive and imitate "much more than what can be literally perceived" (p. 212) may be the only road there is.

19.2 The Imitation Superhighway
Harry Litman on Dijksterhuis

Dijksterhuis' chapter is surely one of the more provocative and synthetic (in the sense of bringing together different strains of thought) in this volume. At the Royaumont conference on imitation, the view was advanced, more or less axiomatically, that we could not function if we went around imitating everyone. Professor Dijksterhuis' chapter argues otherwise, suggesting that we not only can, but generally do, function in this way. Dijksterhuis marshals extensive evidence that imitation on many levels is our default mode of functioning and that it operates automatically unless it is countermanded.

As I read his chapter, Dijksterhuis' "high road" extends very well beyond discrete motor behaviors to "various forms of interpersonal behavior, intellectual performance, and attitudes" (vol. 2, ch. 9, p. 217). Thus, a slowed gait might arise from any of the following: seeing another's slow gait; seeing another's slow behavior other than a gait; seeing someone whom one knows to be a slow person; seeing a member of a slow group, such as the elderly (whether or not the observed group member in fact exhibits the trait stereotypically associated with the group); seeing or thinking of the word "slow"; thinking of words such as "molasses" that are associated with slowness; thinking of words that are associated with groups that are slow (for example, "geriatric" or "bingo," which are associated with the elderly); and subliminal associations with slowness. And that is just for one sort of behavior and one kind of priming input. As Dijksterhuis asserts in section 9.6 (p. 217), "relevant research has shown by now that imitation can make us slow, fast, smart, stupid, good at math, bad at math, helpful, rude, polite, long-winded, hostile, aggressive, cooperative, competitive, conforming, nonconforming, conservative, forgetful, careful, careless, neat, and sloppy." In other words, it affects our entire psychological functioning. We thus have the ideomotor idea writ enormous, applied not only to essentially all perception of the outside world, but also to all levels, conscious and subconscious, of human thought, feeling, and motivation. This is a high road with many, many lanes.

Much of this seems marvelous, and some of it perhaps seems dubious. Yet note that the effects or tendencies that Dijksterhuis reports are quite subtle and easily inhibited. (One possible criticism of Dijksterhuis's account is that he apparently does little to measure, or at least to relate, the magnitude of the priming effects he has observed in the clinic.) We plausibly are seeing here an account of a very low-level, ephemeral contribution of others to mood, a sort of intuitive registration (and, Dijksterhuis would posit, replication) of the behavior and likely behavior of those around us.

The implications for public policy of Dijksterhuis's imitation as "social glue" theory are immense (again, depending on the magnitude of the effects Dijksterhuis posits). Most obviously, his ideas about the prevalence of imitation provide strong ammunition to the proponents of regulating media violence. If Dijksterhuis is right, then each of the estimated six times in an hour of prime-time television that a violent act is portrayed, millions of viewers become somewhat more likely to commit violent acts, and some percentage of them will be caused to do so. (And that is not even to mention the countless references to or portrayals of violent behavior in news reports, music videos, football games, late-night movies, etc.) As he puts it, "We do not choose to imitate at some times and not others. Rather, we are wired to imitate and we do it all the time, except when other psychological processes inhibit imitation" (pp. 218–219). Dijksterhuis's theory that imitation occurs more or less automatically bolsters the case for regulation, notwithstanding free-speech concerns or constitutional protections.

In particular, the sort of research Dijksterhuis chronicles could support either of two kinds of arguments that are typically offered in response to free-speech challenges to regulation. The first is that the speech in question has an immediate and inexorable harmful impact.[1] Dijksterhuis suggests that given our hard-wired propensity to imitate, violence in the media will certainly, if subtly, increase the amount of violence in the community.[2] The second is that the regulation is in fact of concomitants of speech that arise through processes that are unrelated to the features of speech that justify its increased protection. Dijksterhuis' work provides a framework for arguing that depictions of violence in the media cause acts of violence in the real world through an extrarational, noncognitive process akin to a reflex. In other words, media violence does not persuade or influence so

1. See, e.g., *Abrams v. United States*, 250 U.S. 616, 630 (1919) (Holmes, J., dissenting) (articulating "clear and present danger" test for regulation of speech).

2. See Hurley, Imitation, media violence, and freedom of speech. *Philosophical Studies* (2004)

much as automatically catalyze or trigger antisocial acts.[3] In this fairly discouraging way of looking at things, the depictions of violence lose much of the value that generally justifies the protection of speech. Beethoven's Ninth Symphony is no doubt constitutionally protected expression, yet courts might well sanction its regulation if it demonstrably affected people at large the way it affects the reprogrammed Alex in *A Clockwork Orange*.

I doubt that at present either of these arguments would have much traction in the courts, which generally require far more concrete and individualized showings of injury, particularly where First Amendment interests are at stake. Moreover, it would, I think, require much more theoretical and empirical work to elaborate Dijksterhuis' theory before it could serve as the basis for policy. In general, his chapter is valuable and fascinating because it suggests the possibility of a hugely expanded inquiry into the phenomenon of imitation. As Dijksterhuis recognizes, in surveying the "high road" of imitation, he is using the term "imitation" rather loosely. It is quite a large move from the low road of imitating discrete physical actions (already a major achievement and apparently one that only higher primates and possibly some species of birds are capable of) to his high road of continuous activation of associated traits and stereotypes. Indeed one way to view Dijksterhuis's chapter is as a potential road map of the future of the study of imitation as a social phenomenon. For now, his account raises a number of rich and, it seems to me, challenging issues, and I note three of them here.

First, we need a better theoretical account of how and when a subject picks out, among myriad candidates, a certain behavior or stereotypical trait to imitate. It may be the case, as Dijksterhuis asserts, that soccer hooligans are "a social group that is associated with stupidity" (p. 215), but presumably they are also associated with athletic ability, or gregariousness, or beer drinking. Perhaps Dijksterhuis' view would be that being primed with pictures of soccer hooligans elicits behaviors consistent with all these associated traits and scores of others, but then the simplest stimulus would provoke an immediate cacophony of associated imitations.[4] It would be

3. Of course, notwithstanding the wealth of evidence Dijksterhuis marshals, this remains a controversial theory. For a general critical analysis of the studies, see Freedman (2002).

4. Similarly, at the level of base stereotype, the archetypal professor is not only intelligent, but, for example, absentminded and gentle; and a politician is not only long-winded, but well-groomed and ambitious. Which of these traits is essential to the imitating observer? And what role might the experimenter's preconceptions of the traits play?

very useful to explore how a particular observed or inferred trait comes to be the relevant candidate for imitation.

Second, we would benefit greatly from a more thorough account of the evolutionary origins and role of Dijksterhuis's notion of imitation. This presumably is what Dijksterhuis is adumbrating with his notion of "social glue" and his general conclusion that imitation is explained by the need to be liked. However, it is clear on brief reflection that such a motive would not itself account for a phenomenon of the breadth and impulsiveness that Dijksterhuis posits. For one thing, there are other strong and often conflicting agendas than the need to be liked, such as the needs to reproduce, to procure food, and to escape predators. And certainly there are many circumstances in which imitation would be decidedly counteradaptive. (Of course, that does not itself make it implausible—not all traits are adaptations—but Dijksterhuis's "social-glue" thesis does seem to presuppose an adaptive explanation.) Dijksterhuis suggests that the impulse to imitate is easily suppressed, but that does little to advance an evolutionary account of a phenomenon that is presented as both automatic and ubiquitous (and it raises a new issue of the adaptiveness of expending such extensive resources in continually priming and suppressing imitation).

Finally, and perhaps most daunting of all, is the challenge of constructing a neurophysiological account of the high road of imitation. It is fairly straightforward to conceptualize (and possible, although no mean achievement, to actually identify) the neural mechanisms that underlie the low road to imitation. Dijksterhuis in fact discusses the groundbreaking work on mirror neurons by Rizzolatti, Gallese, and others. This work, which has genuinely exciting implications for many fields of study, has located individual neurons of highly specialized function. It is fairly overwhelming to consider what would be required to expand that concept into the higher-order functions and locales involved in the far more conceptual stereotyping that takes place on Dijksterhuis's high road. Constructing an adequate neural description of the broad phenomenon that Dijksterhuis is describing would at a minimum be a Promethean task—a human genome project for imitation.

19.3 The Crimes of Proteus
Harry Litman on Gambetta

In a very interesting chapter that resonates in literature, film, dream theory, and true-crime yarns, Gambetta presents what he describes as a broad-based programmatic method to begin to study a phenomenon—mimicry—

that is widespread yet barely recognized. I will comment by offering a few points of practical connection between his ideas and the criminal law, followed by a few suggestions for ways in which his program might be carried forward if, as he predicts, the study of mimicry is to grow into a free-standing interdisciplinary field.

A brief prefatory point is that Gambetta's chapter illustrates the breadth and diversity of the phenomena grouped in these volumes under the umbrella term "imitation." The subpersonal and neural perspectives on imitation suggest two defining criteria—a discrete physical action and a defined goal—and neither is present here. Rather, Gambetta addresses a behavior, or set of behaviors, that is more abstract and considerably more broad in its manifestation than the behavior described by Rizzolatti (vol. 1, ch. 1) and Gallese (vol. 1, ch. 3).

Indeed, a possible criticism of Gambetta's concept is its potentially enormous span. For example, the concept arguably captures much of the psychological mechanics of the advertising industry, in which a behavior *m*—such as driving a Mercedes or wearing certain jeans—is used intentionally and often falsely to signal membership in, or pass oneself off to, a desired group *k*—such as the jet set.

As Gambetta writes, the world of crime is replete with instances of mimicry, and certainly it provides many of the genre's most flamboyant and consequential examples. Indeed, in keeping with Gambetta's suppositions, there is a crime that is widespread—it is in fact the fastest-growing crime in the United States—yet is only beginning to be recognized and classified in its own category.

This crime is identity theft. Several years ago, it was exotic enough to be unnamed; now it is an acknowledged epidemic. The U.S. government estimates that there were 27.3 million victims between 1998 and 2003, and 9.9 million in 2003 alone. The identity thief's modus operandi is to appropriate a critical piece of identifying information—Gambetta might say a "symbolic string"—and then to exploit the appropriated identity to commit fraud, for example, by securing loans or opening bank or credit card accounts in the victim's name.

One of the crime's more pernicious aspects is that most victims do not become aware for some time (on average, more than a year) that their identities have been stolen, and on average they wind up spending about 175 hours repairing the damage. Along with computer crime, identity theft is the crime par excellence of the Internet age, which has occasioned the widespread use and dissemination of more and more bits of identifying information.

It also is possible to draw parallels between, on the one hand, Gambetta's schema and terminology, and on the other, the policy responses to identity theft, which in main consist of what Gambetta might describe as various strategies to raise the production costs of mimicking signals. This is the shorthand explanation, for example, for requiring a government-issued photo ID to use an airline ticket. It is far more difficult and risky (among other reasons because it is a separate crime) to counterfeit someone's driver's license than it is to ascertain that person's Social Security number.

We can further apply Gambetta's approach to a range of familiar behaviors in crime and law enforcement, including instances in which the criminal can play model or dupe as well as mimic. Consider in this regard probably the most common and effective law enforcement strategy, the sting operation, in which an undercover agent, or even a cooperating criminal, feigns criminality to catch the target in a crime. It is interesting that in such high-stakes "communicative warfare," law enforcement is vulnerable in turn to a common counterstratagem, which is to ferret out the agent by making the differential costs of mimicry prohibitive to a law-abiding mimic. Thus, gang members who suspect that a confederate is a government agent may require him to carry out a killing or other violent crime, which, to use Gambetta's terms, raises the differential costs to a point that non-ks (i.e., noncriminals) cannot pay.

I close with a few suggestions for further study, particularly with respect to potential formulation of policy in the criminal law. Gambetta classifies mimicry systems according to the basic (and largely antagonistic) relationships between three protagonists—model, mimic, and dupe. Other taxonomies could be helpful both as classification tools and as bases of policy. In the area of the criminal law, two additional criteria come to mind.[5] The first is the state of mind of the mimic. Gambetta looks at a range of behaviors in which the mimic's motivation varies widely, from puffery to high wickedness. Placement along that spectrum will help determine whether behavior is criminal, as opposed to merely mischievous, and help assess the conduct's blameworthiness (which will largely determine the criminal penalty).

5. The classic and highly entertaining sociological study by the linguist David W. Maurer, *The Big Con* (1940), presented a fairly scientific breakdown of the confidence man's book of big-money grifts (i.e., the "wire," the "rag," and the "payoff") according to the elements of the individual scheme and its particular methods for "trimming" the "mark."

From the standpoint of criminal law policy, the second important criterion that Gambetta's work does not yet address is the kind and degree of the harm to the victim. The law is likely to draw distinctions according to whether the harm is tangible or intangible, and perhaps according to whether the victim is the dupe or the model. The criminal law is most easily adapted to redress tangible, economic harm to a dupe—the classic model of fraud and the typical pattern in the case of identify theft. But a full rendering of the harms occasioned by criminal mimicry would have to include intangible social harm, i.e., injury to the social interest in the security and relative mimic-proofness of signs. There is thus a separate crime for appropriation of another's Social Security number, even in the absence of any economic injury, which can be justified by the shared social interest in the reliability of the Social Security number as an identity signal.

Finally along these lines is the interesting case of intangible harm to the model as opposed to the dupe. Should we recognize, as we do in the law of defamation,[6] an intrinsic harm to the model separate and apart from any tangible loss? The mimic exploits and injures the model's recognizable identity, an essential aspect of trustworthy communication and productive exchange. To many victims of identify theft, it is this injury, more than the inconvenience and economic loss (which is often borne by commercial interests such as credit card companies) that is the most keen and fundamental.[7]

19.4 Media Violence and Aggression, Properly Considered
George Comstock on Eldridge

John Eldridge has produced a wide-ranging and interesting survey of issues raised by the topic of violence in the media. He explores a number of themes:

- the claims by some that the empirical research literature on media violence is incoherent and uninterpretable because media violence is too diffuse, complex, and varied for meaningful investigation;
- the tendency of the media and some public officials to leap to conclusions about media influence when more careful scrutiny of the events in question shows little or no evidence of media effects;

6. See Post (1986).

7. This is an interesting fact itself for further study. One can imagine an argument in evolutionary theory—akin to the evolutionary theory of literature on cheating—that addresses the nature of the injury inherent in being the victim of identity theft.

• the concern of an artist that the transfer of a work from one medium to another that is more popular and accessible may distort and obscure the original author's antipathy to violence, with the writer in this case Anthony Burgess, the filmmaker Stanley Kubrick, and the work *A Clockwork Orange*; and
• the use of the media in times of conflict to depict a nation's enemies as meriting punishment for the atrocious, violent acts they have committed

The first is an extraordinary case of myopia. Barker (1997) insists on seeing only the forest and doggedly averting his mind from identifying the various species contained therein. Plenty of meaningful research within the social and behavioral sciences has been done on media violence, although from a variety of perspectives. Two examples will suffice. One is the social cognitive paradigm of Albert Bandura (Bandura et al., 1963a,b). The other is the cultivation paradigm of George Gerbner (Gerbner & Gross, 1976; Gerbner et al., 1980). The first has examined the conditions under which children learn from models, some of whom may be vicarious—in entertainment, news, and sports—and who provide examples of aggressive and antisocial behavior. The second has examined how the emphases of media portrayals affect the public's perceptions, and violence—in entertainment, news, and sports—is a frequent emphasis.

Distortions of bizarre crimes by the tabloid press are probably a worldwide phenomenon. However, the examples also are probably more noticeable and nationally prominent in Great Britain than comparable coverage would be in the United States because the London press is a much larger presence on British newsstands than are the New York tabloids across the United States. In the United States, accounts emphasizing the harmful influence of the media have been the exception rather than the rule. In fact, in the United States the news media have been schizophrenic in their readiness to blame the media for violent occurences. The finger of blame has been readily pointed at the products and practices of popular culture in high profile cases, such as the car crash that killed Princess Diana, the murder committed in connection with the *Jenny Jones* show, and the Columbine High School shootings (Scharrer et al., 2003). In regard to an everyday link between television and film violence and aggressive and antisocial behavior, however, the news media have downplayed the possibility of a connection.

Bushman and Anderson (2001) document the latter pattern. They show that since 1975 the average correlation between exposure to violent portrayals and aggressive or antisocial behavior in experimental and nonexperimental designs has increased in magnitude (a pattern attributable to

the increase in the magnitude of the correlations in the nonexperimental designs), while the frequency of news reports that exposure to media violence and aggressive or antisocial behavior are correlated has decreased. The curve representing the correlation sweeps upward and the curve representing what the authors consider the accuracy of news reporting visibly declines. The two have followed quite different trajectories, with the media favoring accounts that downplay the possibility of media influence.

Anthony Burgess was probably justified in his concern. Movies (and television shows) never perfectly reproduce a novel (although some have come quite close), so the possibility of a change in emphasis or message is always present. In addition, while novels and written work in general certainly can influence behavior, movies (and television shows) have a number of properties that make them particularly likely to lead to imitation or emulation. The visual elements often clearly convey acts that otherwise would not be encountered, so there is both an easy-to-comprehend model and novel behavior. These are usually parsed in real time, with little critical reflection on the implications of content. Most of the thoughts that arise center on the qualities of the presentation as entertainment—plot, character, action, suspense, special effects—and whether it was worthy of attention. The models are typically very attractive and often antisocial acts are rewarded, with even villains in the short run (and sometimes in the long run, too) enjoying success. The perspective imposed by the director can easily (and sometimes does, as Burgess believed was the case with *A Clockwork Orange*) give a viewer quite different interpretations of what are concretely the same events, and can make antisocial or criminal behavior acceptable or at least not subject to the usual moral approbation.

The American crime epic *Heat* provides examples of several of these factors. The criminals successfully rob an armored truck using explosives available from any construction supplier. The truck's crew is wantonly killed by a psychopathic newcomer. Robert De Niro, the gang's leader, successfully maneuvers his men through a series of mishaps, including the repair of a marriage. A bank heist goes bad. Val Kilmer opens up on downtown Los Angeles with an automatic weapon. Cops die. Kilmer is a man of steel. He also has been among the most likeable of a very likeable bunch of crooks. We hope he will evade the trap using his wife as bait that is set for him by the lead detective in the case, Al Pacino. The hint of betrayal for this couple, even if forced, makes us uncomfortable. Kilmer evades the trap; De Niro is not so fortunate. Pacino kills him, but has the opportunity to do so only because De Niro pursues what he considers an act of honor. Thus a cold-hearted killer (Val Kilmer) and an accomplished criminal (De Niro) become sympathetic characters.

The role of the media in making harsh measures against members of an outgroup—whether defined by nation, religion, ethnicity, or social behavior, such as sexual preference—more acceptable is hardly trivial. This influence is particularly noticeable in international conflicts, where the media of each country typically portray its enemies as having committed atrocities or behaved in an infamous manner. This is the process, described by Albert Bandura in *Social Foundations of Thought and Action* (1986), by which categories are created that remove people from the human stream so that they can be treated inhumanely without public protest. This is a special case of desensitization—the inhibition of responses to the suffering of others.

The more general case is represented by the hypothesis that exposure to media violence reduces responses to everyday violence. In fact, there is not much evidence directly in support of desensitization to everyday violence as a result of media exposure. This is because the research has involved desensitization to mediated depictions—fictional or ostensibly factual—of violence. However, desensitization by the media to media depictions of violence is a socially important outcome. It is only through the media that we learn about what is transpiring beyond our immediate experience, including the behavior of other nations and people who are not like us. The news media become the basis in these cases for thoughts and feelings about what is just and right. They become the source for moral judgments. Thus, their role in desensitization to the violence they report has persistingly disturbing implications.

These are all important issues raised by the topic of violence in the media. However, one aspect of media violence not much addressed by Eldridge is the issue that is most central to the theme of this conference—imitation and emulation. The issue of the possible influence of violent television (and movie) portrayals on aggressive and antisocial behavior receives comparatively little attention. It is practically made to disappear under the unfurled flags of the other topics discussed.

The most useful introduction to the empirical evidence on television and film violence and aggressive and antisocial behavior at this point in time is through meta-analyses (Comstock and Scharrer, 2003). Using the standard deviation as a criterion, meta-analysis combines the results of as many studies as can be found to estimate the magnitude of the relationships among variables. It is a quantitative aggregation of study outcomes. The key element is a singular property of the standard deviation—it has the same relationship to every approximately normal curve regardless of the subject matter, metric, or distribution. Thus, about the same proportion of cases always falls within plus or minus 1 standard deviation of the mean. As a result, estimates of differences between those who receive and do not receive a particular treatment from both experimental and nonexperimental designs that represent their relationship to the standard deviation can be averaged. The method is analogous to the use of a percentile; a standing at a particular rank quantitatively always means the same thing regardless of the particular measure. These estimates, because they are based on many studies, are more reliable and more valid than those produced by a single study (M. Hunt, 1997). Meta-analysis thereby enhances the quality of evidence while also providing a quantitative survey of the outcomes in a particular area of inquiry.

Unhappily, meta-analysis is not a substitute for interpretation. Experimental designs must be evaluated for the generalizability of their outcomes to other, everyday circumstances. Nonexperimental designs similarly must be assessed for the meaning to be assigned to the everyday associations they record—correlation, causation, or essentially a null relationship.

In the present instance, there are seven quantitative aggregations of study outcomes. The first is simply a tabulation and did not employ the standard deviation as a criterion. Andison (1977) categorized the outcomes of sixty-seven experiments and surveys by the direction and size of the relationship between the viewing of violence and aggressive or antisocial behavior. The remaining six all employed the classic and now widely accepted meta-analytic paradigm. Hearold (1986) was the first to apply it to the literature on media and behavior. She was a student of Eugene Glass at the University of Colorado (who developed meta-analysis in the 1970s in an attempt to quantitatively discredit H. J. Eysenck's claims that psychotherapy was ineffective), and examined 1043 relationships (drawn from 168 studies) between exposure to anti- and prosocial portrayals and anti- and prosocial behavior. W. Wood et al. (1991) examined only experiments in which the dependent variable was "unconstrained interpersonal aggression" among children or teenagers, and analyzed the outcomes of twenty-three studies in and out of the laboratory that met these criteria. M. Allen et al. (1995) aggregated the data from thirty-three laboratory-type experiments in which the independent variable was exposure to sexually explicit video or film portrayals and the dependent variable was aggression. Hogben (1998) confined himself to fifty-six coefficients drawn from studies measuring everyday viewing, but included a wide variety of aggression-related responses, including hostile attitudes, personality variables, and in one case the content of invented news stories, as well as aggressive or antisocial behavior.

Bushman and Anderson (2001) calculated the correlations by 5-year intervals over a 25-year period (ending in 2000) in experimental and nonexperimental designs between exposure to violent television or film portrayals and aggressive and antisocial behavior. Paik and Comstock (1994) comprehensively updated the portion of Hearold's analysis representing the relationship between exposure to television violence and aggressive and antisocial behavior (and ignored other portions, such as prosocial outcomes and portrayals and nonbehavioral antisocial outcomes), and included 82 new studies for a total of 217 that produced 1142 coefficients between the independent and dependent variables.

These analyses, representing the behavior of many thousands of persons of all ages, a wide range of independent and dependent variables representing the concepts of exposure to violence and aggressive or antisocial behavior, and a variety of methods, make it irrefutably clear that children and teenagers who view greater amounts of violent television and movie portrayals are more likely to behave in an aggressive or antisocial manner. This holds for the data from both experimental and nonexperimental designs. All seven of the quantitative aggregations support such a view, including the four not confined to a narrow focus in regard to aggression and antisocial behavior: Andison (1977), Hearold (1986), Bushman and Anderson (2001), and Paik and Comstock (1994).

The case for causation rests on the consistency of the outcomes for the experimental designs and the confirmation by the survey designs of the generalizability of the experimental findings. This is not simply a matter of agreement between different methods, but of different inferences making a stronger case than either would alone. The generalizability of the causal evidence from the experiments is supported by the positive correlations in the surveys between viewing violence on an everyday basis and everyday aggression and antisocial behavior that are not apparently explainable other than by some contribution from viewing violence.

The "reverse hypothesis," which holds that the correlations in everyday life are attributable to the preference for violent entertainment of those particularly likely to engage in aggressive or antisocial behavior, presents the strongest challenge and as a sufficient explanation fares quite badly. Two key datasets are Kang's (1990) reanalyses of the NBC 3.5-year repeated-measures panel data (Milavsky et al., 1982) on elementary schoolchildren and Belson's (1978) survey of about 1600 teenaged males in London. Most survey data must be confined to inferences of association rather than causation because variables are measured at only one point in time, thereby obscuring an answer to the question of which variable caused a change in the other. Kang evaded this particular obstacle by using data from the NBC survey design in which questionnaires were administered at multiple points in time. This permitted the inclusion of time order in the analyses, with either viewing or behavior preceding the other. He found twice as many significant coefficients, eight versus four, for a viewing-to-behavior effect than for a behavior-to-viewing outcome out of a total of fifteen pairings of earlier and later measurement (there were six waves of measurement; thus, a total of fifteen possible pairings).

Belson found in his very large sample that the reverse hypothesis did not supply an adequate explanation for a positive association between the viewing of violence and the committing of seriously harmful, illegal acts (such as attempted rape or the use of a tire iron or razor in a fight) among a subpopulation with a high likelihood of delinquent behavior. More specifically, he found by using various statistical manipulations that viewing violence predicted a substantial increase in antisocial behavior, while aggressive propensity predicted only a minute difference in viewing violence. Thus, behaving in an antisocial manner may sometimes predict the seeking out of violent entertainment, but it fails to fully explain the associations observed between exposure to television and film violence and aggressive and antisocial behavior.

The research, as one would expect, goes well beyond the question of whether the media influence antisocial and aggressive behavior. It also addresses two other issues—the psychological dynamics underlying effects and the various individual attributes that increase or decrease the likelihood of influence.

Although they have taken on a number of specific guises at the hands of different experimenters, the factors that psychologically govern responses to violent and antisocial portrayals fall into four broad categories (Comstock and Scharrer, 1999): efficacy, normativeness and pertinence in regard to the behavior in question, and susceptibility in regard to the readiness of the individual to act. Specifically, portrayals that present the behavior as rewarded (efficacy), socially approved (normativeness), and relevant to the viewer (pertinence) have been demonstrated to increase the likelihood of imitation or emulation. In turn, states of anger or frustration on the part of the viewer, particularly if a person responsible for the anger or frustration is a potential target for aggressive or antisocial behavior, increase the likelihood of imitation or emulation.

The evidence on behalf of these contingent conditions is quite strong because the data have all been collected by experimental designs in which causation in regard to the independent variable can be inferred. Thus,

individuals respond with apparent rationality to media portrayals, imitating or emulating when the behavior (1) is cast as likely to serve the ends of the viewer, (2) is unlikely to arouse scorn and likely to enjoy the approval of others, (3) seems linked to the circumstances of the viewer, and (4) there is some motivation to engage in the behavior. However, there is some uncertainty over the process by which the first three of these factors operates. Some authors emphasize cognitive elements, in which the media alter attitudes, beliefs, and values (Eron & Huesmann, 1987). Others (Comstock, 2004; Comstock & Scharrer, 2003) suggest that these factors may operate by affecting the salience and accessibility of the behavior in the repertoires of individuals without altering attitudes, beliefs, and values. This is an issue yet to be resolved, and it is possible that both function under different circumstances or that the two operate simultaneously.

Three major attributes of individuals have been examined (Paik & Comstock, 1994; Comstock & Scharrer, 1999): gender, age, and predisposition. Although the early experiments with Stanford nursery school children by Bandura et al. (1963a,b) indicated that males would be affected more frequently, the overall pattern now shows that males and females are affected about equally. There is some tendency for the size of effect to decline with age, but a "medium" effect size among young adults of college age disrupts the linearity of the trend, and the effect size for adults falls above "small" although below "medium" (by the criteria of Cohen, 1988), so it cannot be said the association between exposure and behavior vanishes among those older. Predisposition is an important factor. There are plenty of datasets where the association between exposure and behavior is limited to or greater among those registering as higher in earlier aggressiveness. However, this cannot be taken as a necessary condition. The consistent record of positive outcomes for experiments recorded by the meta-analyses makes a strong case that those not particularly predisposed also may be affected, unless the definition of predisposed is made so broad as to cover large portions of the population. This should not be surprising. There is much that those not familiar with aggressive and antisocial behavior might acquire—in the sense of being better prepared to perform such acts by having seen them performed with some success by others—from media portrayals.

Two issues remain. One is what meta-analysts call the "effect size": How large is the association? The other is seriously harmful criminal behavior: Is it affected?

Cohen (1988) advanced labels for effect sizes of $r = .10$ = small; $r = .30$ = medium; and, $r = .50$ = large (Rosenthal et al., 2000). By these criteria, the effect sizes recorded are usually modest (the plural is necessary

because the magnitude of associations will vary by such factors as type of aggression, method, television program characteristics, and age and gender of respondents or subjects), and vary from approaching or achieving the medium range to small and sometimes large. In the Paik and Comstock meta-analysis, a recent comprehensive endeavor, the effect sizes in the survey designs for interpersonal aggression approach medium ($r = .24$ for physical aggression against a person and $r = .27$ for verbal aggression). This represents a socially significant effect because the stealing, hitting, and name-calling involved would be quite unpleasant to most victims and could trigger retaliation. Interpersonal aggression is also the most examined in the surveys of all forms of aggressive or antisocial behavior, and thus enjoys substantial reliability as an outcome as well as a claim to validity as representing an unwanted, hurtful experience.

In a comparative approach, Bushman and colleagues (Bushman & Anderson, 2001; Bushman & Huesmann, 2001) assembled a number of effect sizes to compare with the overall effect size of $r = .31$ for television violence and aggression recorded by Paik and Comstock (1994), and found that it was exceeded in their collection only by that for smoking and lung cancer and was greater than that for passive smoking in the workplace and lung cancer or calcium intake and bone mass. By both quantitative standards (Cohen's criteria and Bushman and colleagues' comparisons), then, the magnitude of the association, while not large, has social importance.

The outcomes representing illegal activities are comparatively few—about one-twentieth of the total outcomes examined by Paik and Comstock (1994). Effect sizes are in the medium range for two categories of nonviolent crime (burglary and grand theft), but become miniscule for violence against a person, although all three coefficients achieve statistical significance. Belson (1978) in his survey of teenaged males in London recorded correlations between exposure to violent television entertainment and vicious behavior, such as rape, use of knives and guns in fights, and smashing up the interior of a house, which he concluded were best attributed to the causal influence of viewing violence. Thornton and Voigt (1984), although explicitly declining to venture into the realm of possible causation, in their large sample of several thousand children and teenagers of both genders in a large southern U.S. urban area found slightly stronger associations between media exposure and more serious forms of delinquency (including hurtful aggression using a weapon) than for less serious forms of delinquency (such as running away) after controlling for a variety of demographic and social variables. Kang's (1990) reanalysis of the NBC panel data makes a good case for a causal contribution of viewing violence

to interpersonal aggression, and the scale employed has items that are certainly on the borderline of illegal or serious harmful activity—hitting and fighting.

J. Johnson et al. (2002), in their recent longitudinal survey ($N = 707$) and one widely publicized because of its appearance in the prestigious journal *Science*, found that "assault or physical fights resulting in injury" were more frequent among the males at the ages of 16 and 22 who had viewed greater amounts of television (and presumably greater amounts of violence) at the age of 14 when five important covariates of viewing and aggression were controlled: childhood neglect, an unsafe neighborhood, low income, low parental education level, and psychiatric disorder. Finally, the U.S. Surgeon General's recent report on violence by youth (U.S. Department of Health and Human Services, 2001), drawing on Paik and Comstock, concludes that viewing violent television entertainment between the ages of 6 and 11 is one of about twenty significant early risk factors for committing seriously harmful violent criminal acts between the ages of 15 and 18; while the effect size is small (by Cohen's criteria), it was as large as three-fourths of the other significant early risk factors. Despite the inevitable methodological issues that can always be raised about this comparatively small body of evidence on illegal and seriously harmful behavior, the data clearly support the view that such behavior, as well as less serious forms of antisocial behavior (for which the seven meta-analyses present a very strong case) are facilitated by exposure to violent television and film entertainment.

19.5 Applying the Science of Imitation to the Imitation of Violence
Susan Hurley on Huesmann

Since the Williams (1981) report,[8] many liberals have felt able to dismiss as unsubstantiated the thesis that exposure to media violence increases aggressive tendencies in viewers. This dismissal is now seriously dated. Huesmann surveys an impressive body of recent theoretical and empirical support for the thesis that exposure to media violence increases violence in viewers. To summarize his arguments: relevant short-term processes include priming, excitation transfer, and immediate imitation, while long-

8. While this report focused on pornography rather than media violence, since much pornography represents violence, issues about whether pornography and media violence have harmful effects are closely related. See Comstock and Scharrer (2003) on the increased effect sizes of stimuli with content that is erotic as well as violent.

term influences are theorized to operate through observational learning of cognitions (in particular, schemas for attributing hostile intentions to others, scripts that link situations to aggressive responses, and norms for evaluating such scripts), and desensitization. Moreover, repeated short-term processes can influence the acquisition of aggressive schemas, scripts, and norms in the longer term, as well as desensitization. Empirical support for these influences comes from various mutually supporting paradigms, which Huesmann integrates effectively.

Well-controlled experiments consistently support the thesis that exposure to media violence *causes* (not merely correlates with) immediate aggression. The generalization of this result from the laboratory to the real world, and across time, is supported by meta-analyses and by longitudinal studies. For example, exposure to media violence in childhood has been found to predict aggression post-high school and at age 30, where other possible explanations such as initial aggressiveness, taste for violent entertainment, class, education, and parenting are controlled for. The results stand up to regression analysis and cannot be explained other than by a causal thesis. There is a strong consensus among researchers on this topic that exposure to media violence increases violence in viewers in both the short and the long term. The effect sizes are comparable to those of other public health risks that are taken very seriously, such as the link between exposure to asbestos and cancer.

Why then does skepticism among the public and some commentators on this empirical work remain so strong?[9] Possible reasons spring readily to mind. These results may threaten our conception of ourselves as autonomous; we dislike any prospect of censorship; and powerful financial interests in the media industry are vested in violent entertainment (Hamilton, 1998). But I want to emphasize here a different (although compatible) reason, which is that the importance of imitation in general in molding human behavioral patterns has not been widely understood or its great social significance appreciated. In particular, the relevance of recent scientific work on imitation surveyed in these volumes to issues of media violence has not yet been assimilated by social science, jurisprudence, or social philosophy.

9. The strong consensus among researchers has not yet got across to the public or the media, who regard the issue as controversial to a degree belied by the actual consensus of opinion among researchers; see Bushman and Anderson (2001) on a disconnect between research results and public opinion on this topic so striking that it has become an object of research interest in its own right.

Responses to studies on the effects of media violence have often been highly politicized and have, unfortunately, ignored the lessons to be learned from the burgeoning work on imitation in general in the cognitive and neurosciences. This is a regrettable result of disciplinary boundaries and blinkers. We should view questions about the imitation of media violence in the context of scientific understanding of imitation in general. The imitation of violence does not have an a priori exemption from what is being learned about imitation at large, which suggests that a general tendency to imitate is fundamental to and distinctive of human nature.

What light does the scientific work on imitation in general throw on the imitation of media violence in particular? It is disturbing simply to rehearse what we have learned about imitation at large with application to violent behavior. Consider the distinctions between the priming of movements, the emulation of goals, and full-fledged imitation made by various contributors to these volumes. All are relevant here. Recall that human beings, along with various other animals, show significant tendencies toward both the priming of bodily movements and the emulation of goals (see R. Byrne, 1995; Heyes & Galef, 1996; Tomasello & Call, 1997; Fadiga et al., 1995). As far as I know, there is no reason to exempt violent action from these quite general tendencies. Thus, observing violent actions should tend to prime similar body movements in the short term, which may or may not be inhibited. When the goal of violent action is attractive, a tendency to emulate such goals, perhaps via trial-and-error learning, should be expected. However, if nonviolent means to the goal are more efficient than violent means, mere emulation of goals need not tend to produce violent behavior—*unless* the creature in question has a strong tendency not just to emulate, but to imitate.

That is just what we humans do have. Human beings have a distinctive and strong tendency to full-fledged imitation of intentional behavior, including novel means as well as novel goals (Tomasello, 1999; Meltzoff, vol. 2, ch. 1). Children tend to imitate, even when it is inefficient, not just to emulate—as do the children who imitate a model by using a rake inefficiently, prongs down, to obtain a treat, instead of simply turning it over to use the edge (see Nagell et al., 1993). If novel violent behavior is observed, human beings should be expected to have a greater tendency than other animals to imitate it. They will tend to copy the violent means as well as the goal, even when the violent means is not an efficient way to achieve the goal.

This underlying default tendency to imitate is poorly inhibited in children, whose frontal inhibitory function is weak (Kinsbourne, vol. 2, ch. 7),

so children in particular should be expected to have difficulty in inhibiting the tendency to imitate violence they observe (see and cf. Philo, 1999a,b). According to ideomotor theories, the underlying tendency to imitate is the normal default tendency for adults all the time, needs specific inhibition, and has effects even when it remains covert (see Kinsbourne, vol. 2, ch. 7; Dijksterhuis, vol. 2, ch. 9; Prinz, vol. 2, ch. 13; and see Chartrand & Bargh, 1999). Thus, a tendency to imitate observed violence should be expected to be present in normal adults as well as children, and to have effects even when it does not result in immediate action. Watching or imagining violent behavior constitutes a kind of *practicing* for violence, a honing of the skills of violence, just as in sporting or musical activities (see Pascual-Leone, 2001; Jeannerod, 1997). Our automatic tendency to assimilate our behavior to our social environment has been called the *chameleon effect*: the mere perception of another's behavior increases, in ways subjects are not aware of, the likelihood that they will engage in similar behavior themselves; modeled personality traits and stereotypes automatically activate corresponding patterns of behavior in us (Bargh & Chartrand, 1999; Bargh et al., 1996; Chartrand & Bargh, 1999, 2002; Dijksterhuis & Bargh 2001; Dijksterhuis, vol. 2, ch. 9). The chameleon effect should lead us to expect that the mere perception of violent behavior will increase the likelihood of automatically engaging in similar behavior, in ways subjects are not aware of. Violent stereotypes or traits, like other stereotypes or traits, should be expected to prime unconscious automatic assimilation, mental as well as behavioral. The assimilation should be expected to apply to violent goals as well as violent means, and not to depend on the subject's volition or on any relevant independent goals the subject may have that would rationalize the resulting aggression or make it instrumentally efficient. If the chameleon effect is the underlying default tendency for normal human adults, then it needs to be specifically overridden and inhibited when violent action is observed, as much as when any other action is observed. If there is a direct link between perception and action, then observing violence should be expected to increase the likelihood of doing violence. The link between representations of violent behavior and similar actual behavior should be as strong and direct[10] as the link for other types of behavior, a

10. In *Ashcroft v. Free Speech Coalition* (2002), the U.S. Supreme Court struck down a statute banning virtual child pornography (produced without using actual children). The *Ashcroft* Court assumed without substantial argument that any causal links between images of child abuse and actual child abuse are "indirect" and "remote," not "strong," and that the criminal act "does not necessarily follow," but "depends upon

link on which powerful evidence from various disciplines converges, as described earlier.

These influences can and often do operate automatically and unconsciously. As a result, they may well bypass the processes of autonomous deliberation and control, in terms of which we normally understand our actions, and are least accessible to control when they are unacknowledged (see especially Bargh, in press; Bargh, 1999).[11] This bypass will be threatening in itself, so that these tendencies will tend to be denied by the subjects who demonstrate them (as Bargh has indeed found). We should expect such tendencies to be especially threatening to people's sense of rational autonomy and control when the influence could result in violent action. We should therefore expect that people will find it especially hard to accept that they might be influenced toward committing violence by watching violent acts (ironically, if Bargh is correct, thereby reducing their ability to inhibit such influences). Perhaps resistance to evidence of the effects of media violence can be explained, not just in terms of vested financial interests in the media industry, but also in terms of such vested interests in the public at large. That is, people have an interest in conceiving of themselves as autonomously rational, which this evidence appears to threaten. These results not only challenge us as individuals, but also challenge assumptions that may have deep roots in liberal political theory about human autonomy.

However, things are not quite as simple as this may imply. At one level our automatic tendency to imitate may threaten our autonomy, but at another level, this may not be so. Rational autonomy arguably depends on language and the ability to identify with and understand others, which in turn arguably depend, among other things, on the distinctively human capacity for imitation. Moreover, there are reasons to believe that the capacity and tendency to imitate is closely connected, both functionally and in terms of neural underpinnings, with other distinctively human

some unquantified potential for subsequent criminal acts." However, a robust causal link does not become indirect merely because it operates over a large population statistically rather than without exception. The Court in *Ashcroft* seems worryingly unaware of the scientific research presented in these volumes. First Amendment jurisprudence is in danger of wedding itself to the now-exploded myth that the content of external representations, words, or pictures does not normally have "direct" effects on behavior, but only effects that are under the actor's conscious control.

11. On the significance of this bypass for issues about freedom of speech, see comments by Brison (vol. 2, ch. 8.10, p. 202) and Litman (vol. 2, ch. 19.2, p. 365); see also Hurley (2004).

capacities—for language, for identifying with others and understanding other minds, and for counterfactual reasoning (see Iacoboni, vol. 1, ch. 2; Arbib, vol. 1, ch. 8.2; Gallese, vol. 1, ch. 3; Decety & Chaminade, vol. 1, ch. 4; Meltzoff, vol. 2, ch. 1; Gordon, vol. 2, ch. 3; and other chapters in volume 2; Arbib, 2002; Gallese & Goldman, 1998; Meltzoff & Moore, 1999a; Rizzolatti & Arbib, 1998; J. Williams et al., 2001; Whiten & Brown, 1998; Meltzoff & Decety, 2003). These capacities in turn are arguably fundamental to autonomous human rationality.

Thus it is not quite right to see our underlying imitative tendencies as simply threatening these distinctively human traits and capacities in general, even if they do so in particular cases. Although imitative processes may often be automatic and unconscious and bypass autonomous deliberation, they may nevertheless also contribute, both ontogenetically and phylogenetically, to our having these traits and capacities in the first place. It may not be true that we would be more rationally autonomous without these underlying imitative tendencies; they may well be a deep feature of human nature. We may only possess our distinctively human abilities to make up our own minds, in rationally autonomous ways, because of the distinctively imitative way in which our minds are made up. This rethinking of the nature of rational autonomy may have social and political implications. Different ways of understanding the nature and basis of our distinctively human rational autonomy may affect the roles this trait plays in political philosophy and practice, and the best ways to foster, protect, and respect it.

Finally, recall the standard objection that a correlation between exposure to media violence and aggressive behavior does not in itself show that such exposure causes violent behavior. As Huesmann explains in chapter 12, researchers have decisively rebutted this objection by demonstrating the convergent results of different research methods, including controlled experimental and cross-lagged longitudinal plus supporting statistical studies (see especially Huesmann & Miller, 1994; Huesmann, 1998; Huesmann et al., 2003; J. Johnson et al., 2002; Paik & Comstock, 1994; Anderson & Bushman, 2001). However, as with the correlation of smoking and lung cancer, understanding the causal mechanism in play contributes to establishing a causal connection. With the discovery of the mirror system and the current development of theories of its function, we may well be on track to understanding the causal mechanism that subserves human imitative tendencies at large, including the tendency to imitate observed violence. Perhaps when the role and mechanisms of imitation in general are more widely understood, so will be the risks associated with the imitation of media violence in particular.

19.6 Acquiring Morality by Imitating Emotions
L. Rowell Huesmann on J. Prinz

In volume 2, chapter 13, Jesse Prinz undertakes to explain how imitation plays an important role in humans' acquisition of morality. His broad-ranging chapter covers several different topics related to morality, including psychopathy, impulsivity, guilt, and shame, and he offers a variety of exciting and provocative ideas. However, here I want to focus specifically on the mechanisms he discusses that are most directly connected with acquiring what might be called "moral beliefs."

What do I mean by "moral beliefs?" Morality can be defined in terms of behavior, but that behavior may or may not be consistent with an individual's beliefs. By moral beliefs, I mean a person's cognitions about what is right and what is wrong for them to do. As I argue later, such beliefs are an important component of morality.

Now Prinz argues that it is through an infant's facial mimicry that imitation first begins to play a role in the acquisition of morality, and I completely agree. He suggests that both the social bonding produced by facial mimicry and the emotional contagion it produces are important. While not disputing that view, I think there is good reason to believe that the emotional contagion process is more important in the long run. Why? There is increasing evidence that there are innate connections between facial expressions and emotional responses (Ekman, 1993). As infants and toddlers imitate expressions, they therefore quite likely experience the corresponding emotion, which is the emotion that the model is experiencing. Essentially, the emotion is imitated and thus can be connected through conditioning with the external stimuli that produced the emotion in the model. As Prinz points out, emotional contagion can also occur without the mediation of facial expressions, but simply through auditory cues; e.g., crying is contagious for infants.

An interesting idea that is stimulated by the conclusion that emotions are imitated is that if one searched hard enough, one should find "mirror" neurons for emotions just as Gallese et al. (1996) have found mirror neurons for intended motor acts. The logic of that argument seems clear. Mirror neurons facilitate imitation by connecting to both the input and output systems. Emotions are imitated. Therefore, there must be mirror neurons for emotions.[12]

12. See discussions of emotional mirroring in Rizzolatti, vol. 1, ch. 1; Iacoboni, vol. 1, ch. 2; Gallese, vol. 1, ch. 3; and Decety and Chaminade, vol. 1, ch. 4. ED.

Let me turn now to the question of how the human child moves from a preliminary ability to imitate emotions to the acquisition of moral beliefs. Prinz concisely walks us through most of the process. By experiencing the emotions of those around them, the infant acquires what we would call empathy—the ability to feel what others feel. Prinz suggests that children then learn what behaviors are acceptable and not acceptable from perceiving what those around them feel in response to their behavior. The process outlined by Prinz is elaborate and undoubtedly correct as far as it goes. However, I think there is an additional imitative process that needs to be considered.

To understand the process I believe is important, one must understand the cognitive revolution that has taken place in social and developmental psychology over the past three decades. In that period social-cognitive and information-processing models have emerged as the dominant theories to explain how children's interactions with the environment lead to lasting behavioral and emotional dispositions (e.g., Anderson & Bushman, 2002; Crick & Dodge, 1994; Dodge, 1980b; Huesmann, 1988, 1998); Some studies focus more on the role of cognitive scripts, world and self-schemas, and normative beliefs (e.g., Huesmann, 1998), while others focus more on perceptions and attributions (e.g., Crick & Dodge, 1994). However, all of them hypothesize a similar core of information processing, and all draw heavily on the work of cognitive psychologists and information-processing theory; in particular they draw from Bandura's (1977, 1986) earlier formulations of cognitive processing in social learning as well as Berkowitz's (1990) neo-associationist thinking.

According to Bandura's (1986) social-cognitive formulations, social behavior is under the control of internal self-regulating processes. What is important is the cognitive evaluation of events taking place in the child's environment, how the child interprets these events, and how competent the child feels in responding in different ways. These cognitions provide a basis for stability of behavioral tendencies across a variety of situations. Internalized standards for behavior are developed from information conveyed by a variety of sources of social influence, including observing the behavior of others, e.g., parents, peers, and characters in the mass media. Berkowitz (1974, 1990), while not disputing the importance of internalized standards, has emphasized the importance of lasting conditioned associations among affect, cognition, and situational cues.

Building on this theorizing I (Huesmann, 1988, 1998; Huesmann & Guerra, 1997) have argued that a crucial phase of behavioral enactment is an evaluation phase in which the social scripts generated for behavior are

evaluated against moral beliefs and rejected if they do not pass muster. These moral cognitions (denoted normative beliefs) are acquired though generalizations made from observing how others behave and the outcome of their behaviors, including the emotions they experience. This process clearly is a form of imitation, but it involves inferences and can only happen as the child becomes mature enough to make logical inferences. In fact I and my colleagues (Huesmann & Guerra, 1997) have shown that such beliefs only crystallize and begin to influence behavior during middle childhood.

In summary, the critical addition I would make to this excellent essay by Prinz is that moral beliefs are acquired, not only through the imitation of emotions and the development of empathy, but through the inferential acquisition of specific beliefs from the observation of others' behaviors and the observation of the emotional and the practical consequences of those behaviors.

19.7 Mirror Systems and Adam Smith's Theory of Sympathy
Robert Sugden

Almost 250 years ago, Adam Smith (1759/1976) proposed a "theory of moral sentiments," explaining human morality as a self-regulating equilibrium of affective responses to the stimuli generated in social life.[13] The basic building blocks of the theory are certain psychological hypotheses about sympathy, which Smith justifies by appeals to introspection and common human experience. I have long believed that Smith's naturalistic approach to the explanation of morality is more fruitful than the more rationalistic approaches that later economists have taken (see Sugden, 1986, 2002). It is exciting to discover just how far Smith's hypotheses about sympathy are consistent with the theories and experimental results of modern psychology and neuroscience.

Smith's *Theory of Moral Sentiments* begins with what I take to be his most fundamental hypothesis: that each of us, when vividly conscious that another human being is in a situation that would induce a particular affective state in us, tends to feel the same affect in a weaker form. Thus, in Smith's

13. This discussion reflects on what I learned about the psychology and neuroscience of sympathy by participating in the Royaumont conference on imitation, and by following up suggestions made to me by other participants, particularly Jean Decety, Robert Gordon, Mark Greenberg, Paul Harris, Stephanie Preston, Giacomo Rizzolatti, David Sally and Paul Seabright. My work has been supported by the Leverhulme Trust.

example of a typical human response to the sight of another person being tortured or beaten:

> By the imagination we place ourselves in his situation, . . . and thence form some idea of his sensations, and even feel something which, though weaker in degree, is not altogether unlike them. . . . When we see a stroke aimed and just ready to fall upon the leg or arm of another person, we naturally shrink and draw back our own leg or our own arm; and when it does fall, we feel it in some measure, and are hurt by it as well as the sufferer. (A. Smith, 1759/1976, pp. 9–10)

In the literature on Smith, there has been much discussion about just what kind of imaginative identification he had in mind, and how far empathy or perspective-taking is involved. In my reading of Smith, perspective-taking supplements a more direct psychological mechanism, working below the level of reason or conscious control. As the example of the beating suggests, this mechanism induces in the observer, as an immediate and involuntary response to his consciousness of a stimulus operating on another person, an affective state similar to that which would be induced by the same stimulus operating on himself.

Many philosophers have dismissed this hypothesis as crude and mechanistic, thinking that a theory of sympathy ought to rest on assumptions more flattering to human reason. However, the mirror mechanisms that are being discovered by neuroscientists such as Jean Decety and Giacomo Rizzolatti seem to have many of the properties postulated by Smith. It seems that an observer's representation of a stimulus acting on another individual can have some of the same neural content as that of the observer's response to the same stimulus acting on him. Given what we now know (but Smith did not) about how brains work, the existence of such mechanisms should not be altogether surprising. In a system made up of a dense network of interconnections, we should expect that perceptions that have significant common features will be processed in overlapping ways, and thus have some tendency to activate similar affective states. Furthermore, as Stephanie Preston and Frans de Waal (2002) point out, this kind of overlap can have evolutionary advantages. Among animals that live in groups, the direct perception of some phenomenon (say, the approach of a predator) and the indirect perception that another individual has perceived it often call for the same action (say, escape). If this combination of perception and action is linked to an emotional response (say, fear), we have a rudimentary mechanism of sympathy.

However, as Smith realized, the idea that sympathy is merely emotional contagion does not seem to explain the *expression* of sympathy among social animals. If the consciousness of another person's pain is painful, why

do we desire other people's sympathy when we experience pain? Why isn't our consciousness of their sympathetic pain also painful for us? And what motivates other people to express their sympathy for us if that merely enlivens their imaginative perception of our pain? Smith's response to this problem is to postulate an additional mechanism: "[the] correspondence of the sentiments of others with our own appears to be a cause of pleasure, and the want of it a cause of pain" (1759/1976, p. 14). According to Smith, whenever one person is conscious of a correspondence between his own affective response to some state of affairs and another person's response to it, that consciousness in itself has a positive affective quality; conversely, consciousness of dissonance of sentiment is painful. This hypothesis is crucial for Smith, since it motivates the mutual adaptation of sentiments that is the basis of morality.

This correspondence-of-sentiments mechanism has been overlooked by many commentators on Adam Smith, and does not seem to play much role in modern psychological theories of empathy. However, the modern literature contains clues which, I suggest, point toward the existence of Smith's mechanism. Particularly significant clues can be found in the comforting behavior that is characteristic of human infants and a range of social mammals. For example, an infant who believes that a parent is hurt will hug the parent, or offer a favorite toy that normally provides comfort to the infant; chimpanzees hug, pat, and groom fellow chimpanzees who are hurt (Batson, 1991; Zahn-Waxler et al., 1992; de Waal, 1996). Both human children and chimpanzees demand comfort when they are hurt, by pouting, crying, or throwing temper tantrums.

Such comforting is often classified as "helping" behavior in the literature of empathy, but it seems to consist primarily in the expression of an affective state of the comforter, which is aligned with that of the comforted. We can see it as helping only because we take for granted a desire on the part of the hurt individual for such a correspondence of affective states. Then, in explaining what motivates the comforter, it is simpler and more direct to suppose that the motive is a similar desire for the correspondence of affective states, rather than a desire to help. This Smithian interpretation of comforting is essentially that proposed by de Waal (1996) in relation to chimpanzees. Like Smith (to whom he refers with approval), de Waal sees the expression of corresponding affective states as a homeostatic mechanism that helps to stabilize social life among individuals with conflicting interests.

I have sometimes felt uneasy about advocating an eighteenth-century treatise as the starting point for current theorizing about the role of morality in economic behavior. I have always had the sense that Smith's introspectively based hypotheses about human psychology were convincing, but I was not sure whether they were supported by hard evidence. It seems that they are.

19.8 The Relation between Language and (Mimetic) Culture
Morten H. Christiansen on Donald

Which came first, language or culture? On the one hand, language seems to be woven into the very fabric of every human culture and to such an extent that it is hard to imagine what human culture would be like without language. Indeed, most myths about the origin of humanity—whether religious or otherwise—seem to suggest that humans had language from the very beginning. On the other hand, what use would humans have for language if they didn't have something to talk about? Living in groups governed by highly intricate social interactions would seem to provide an endless amount of possible discussion material. Yet, many other primate species also live in complex social groups, but notably without the benefit of humanlike language. Some sort of shared culture would seem to be a plausible additional component as a necessary prerequisite for language.[14]

Donald (vol. 2, ch. 14) argues for the latter scenario, proposing a "culture-first" theory in which the prior emergence of a mimetic adaptation provides scaffolding for the subsequent evolution of language. A set of domain-general cognitive skills is suggested to have evolved in early hominids, allowing rudimentary knowledge to be shared across individuals in a nonverbal manner. The selective advantage of such information exchange would then exert pressure toward improving communication, leading to the emergence of language as an efficient system for sharing cultural knowledge. Although this perspective provides suggestions regarding a possible origin of language, it tells us little about the subsequent evolution of language into its current form. Here I will seek to put Donald's account in relief[15] by discussing possible cognitive constraints that may help explain why language has evolved into the form it has today.

14. Thanks to Chris Conway, Rick Dale, and Gary Lupyan for their helpful comments on an earlier version of these comments.

15. It should be noted that the account of the *evolution* of language presented here is not dependent for its validity on the merits of Donald's account of the *origin* of language. Rather, it is an independent account of language evolution that is compatible with Donald's theory of language origin, but is not theoretically intertwined with it.

19.8.1 Mimesis and Language Evolution

The cornerstone of Donald's theory is *mimesis*, an evolved cognitive capacity unique to humans. The concept of mimesis is perhaps best understood when compared with the related notions of mimicry and imitation. Mimicry refers to a deliberate reduplication of a perceived action without attention to the possible purpose of the event, such as when a child parrots the speech of one of its parents. Imitation denotes a more abstract reduplication of action in which more attention is given to its purpose, such as when children imitate adult behavior and responses when playing "house." Finally, mimesis involves the reduplication of action sequences for the purpose of social communication, such as when a child stamps its foot to communicate its disagreement with some decision made by its parents. In this account, mimicry, imitation, and mimesis, rather than being categorical distinctions, correspond to points on a continuum of increasingly more abstract and socially informed reduplicative actions.

Whereas mimicry and to a limited extent imitation, can be found in nonhuman species, Donald argues that the capacity for mimesis has evolved only in the *Homo* lineage, starting some two million years ago. The emergence of mimesis is seen to have involved a series of adaptations primarily to the motor systems. This would have provided an expressive repertoire of motor actions upon which a nonverbal communicative culture could slowly emerge. This mimetic culture then formed the basis for the origin of language, first entering the evolutionary stage as a protolanguage encompassing one- and two-word utterances, and then gradually evolving into its current complexity through processes of cultural transmission.

19.8.2 Mimesis and Sequential Learning

An underlying assumption of Donald's view on the origin of language is that the first protolanguage must have relied on preexisting primate capabilities. Elsewhere he has thus suggested that "there might have been a dramatic discontinuity of *function* in the evolution of language, but there could not have been any discontinuities of *mechanism*" (Donald, 1998, p. 44). This continuity perspective becomes particularly important when it comes to explaining how various evolutionary changes in primate brain circuits may have affected the emergence and evolution of language.

A key component of the mimesis theory is the ability to memorize a social series of experienced events, or "episodes." As such, mimesis is crucially dependent on our ability for sequential learning; that is, the ability to encode and represent the order of discrete elements occurring in a temporal sequence. In line with the continuity perspective, hominid evolution does

appear to have involved important refinements of sequential learning. A recent review by Conway and Christiansen (2001) of sequential learning in nonhuman primates indicates that these primates share with humans good abilities for learning fixed sequences (such as a fixed string of sounds making up a word) and simple statistically governed structures (for example, one can segment the strings "funny robot" into "funny" and "robot" because these two syllable sequences statistically occur more often together than does "nyro"). However, when it comes to the learning of hierarchical structure, monkeys and apes fall short of young children. Hierarchical learning appears to be crucial for syntactic processing, in which words are combined into phrases that can be combined with other words or phrases to form new phrases that in turn can be combined with yet other words or phrases, and so on. Not only would a preadaptation for hierarchical learning seem to be a precondition for Donald's nonverbal mimetic culture, but also—and perhaps more important—it would seem to be a prerequisite for the evolution of complex syntactic language.

19.8.3 Language Learning and Evolution

Donald suggests that the human brain has evolved to be maximally flexible and plastic so as to better be able to acquire the intricacies of human culture. As for language itself, he has suggested that "much of the replicative information needed to perpetuate language is stored in culture, not in the genes" (Donald, 1998, p. 50). However, if culture were the only constraint on language, this perspective would suggest that we should find few commonalities among languages (and cultures). Yet the languages of the world, despite their many differences, also share many systematic similarities in their structure and usage, which are sometimes referred to as linguistic universals. Although the space of logically possible ways in which languages could be structured and used is vast, the world's languages occupy only a small fraction of this space. For example, of the world's languages, more than 50% have a subject-object-verb word order whereas only 0.25% at most have an object-subject-verb word order (Dryer, 1989).

Donald's perspective does not allow us to explain the existence of such universal linguistic patterns; it cannot tell us why language is structured the way it is or why language is so readily learned. To answer these questions we need to go beyond the mimesis perspective (or at least augment it). Instead of asking why the human brain is so well suited for learning language, we need to ask why language is so well suited to being learned by the human brain. By turning what is often a standard question about the language evolution on its head, it becomes obvious that languages exist

only because humans can learn, produce, and process them. Without humans there would be no language (in the narrow sense of *human* language). This suggests that cultural transmission has shaped language to be as learnable as possible by human learning mechanisms (Christiansen, 1994; Christiansen et al., 2002).

In order for languages to be passed on from generation to generation, they must adapt to the properties of the human learning and processing mechanisms. This is not to say that having a language does not confer a selective advantage on humans. It seems clear that humans with superior language abilities are likely to have a selective advantage over other humans (and other organisms) with lesser communicative powers. However, what is often overlooked is that the pressures working on language to adapt to humans are significantly stronger than the selection pressure on humans to be able to use language. In the case of the former, a language can survive *only* if it is learnable and processable by humans. On the other hand, adaptation toward language use is merely *one out of many* selective pressures working on humans (such as, for example, being able to avoid predators and find food). Whereas humans can survive without language, the opposite is not the case. Thus, language is more likely to have been shaped to fit the human brain than the other way around. Languages that are difficult for humans to learn simply die out or, more likely, do not come into existence at all.

This view of language as an adaptive system has a prominent historical pedigree. Indeed, nineteenth-century linguistics was dominated by an organistic view of language (for a review, see, e.g., McMahon, 1994). The evolution of language was generally seen in pre-Darwinian terms as a progressive growth toward attainment of perfection, followed by decay. In the twentieth century, the "biological" perspective on language evolution was resurrected within a modern Darwinian framework by Stevick (1963) and later by Nerlich (1989). Christiansen (1994) proposed that language be viewed as a kind of beneficial parasite—a *nonobligate symbiont*—that confers some selective advantage on its human hosts, without whom it cannot survive. Building on this work, Deacon (1997) further developed the metaphor by construing language as a virus.

The basic asymmetry in the relationship between language and the human brain is underscored by the fact that the rate of linguistic change is far greater than the rate of biological change. Whereas Danish and Hindi needed fewer than 5000 years to evolve from a common hypothesized proto-Indo-European ancestor into very different languages (McMahon, 1994), it took our remote ancestors approximately 100,000 to 200,000 years to evolve from the archaic form of *Homo sapiens* into the anatomically modern form, sometimes termed *Homo sapiens sapiens*. Consequently, it seems more plausible that the languages of the world have been closely tailored through cultural transmission to fit human learning, rather than the other way around. The fact that children are so successful at learning language is therefore best explained as a product of the adaptation of linguistic structures, and not as the adaptation of biological structures toward an innate endowment of linguistic knowledge (such as a Universal Grammar).

19.8.4 Constraints on Language Evolution

Although Donald acknowledges in his chapter that "cultures and languages must be assimilated easily by infants during development" (vol. 2, ch. 14, p. 291), it also seems clear that his account would suggest that the universal constraints on the acquisition and processing of language are essentially arbitrary. Given the emphasis on a cultural storage of the replicative aspects of language, linguistic universals appear arbitrary because it is possible to imagine a multitude of culturally useful, and equally adaptive, constraints on linguistic form. In the perspective on language evolution put forward here, linguistic universals are in most cases *not* arbitrary. Rather, they are determined predominantly by the properties of the human learning and processing mechanisms that underlie our capacity for language. The constraints on these learning mechanisms become embedded in the structure of language because linguistic forms that fit within these constraints will be more readily learned, and hence propagated more effectively from speaker to speaker.

This account of language evolution also has important implications for current theories of language acquisition and processing. It suggests that many of the cognitive constraints that have shaped the evolution of language are still at play in our current language ability. If this is correct, it should be possible to uncover the source of some of the universal constraints in human performance on sequential learning tasks. For example, in a series of studies that combined artificial neural network modeling and artificial language learning, we have shown how universal constraints on the way words are put together to form sentences, as well as the formation of complex questions across the world's languages, can be explained in terms of nonlinguistic constraints on the learning of complex sequential structure (for an overview, see Christiansen et al., 2002).

19.8.5 Conclusion

Donald proposes that the origin of language is rooted in a mimetic culture that evolved prior to the emergence of language. I have argued here that although mimesis may provide one possible explanation of the origin of language, it tells us little about its subsequent evolution, including why language looks the way it does today. I have suggested that we may obtain insights into these questions by asking why languages are so well suited for human learning, thus turning upside down the standard question of why human brains are so well adapted for learning language. From this perspective, language has been shaped by cultural transmission over many generations to be as learnable as possible by the learning mechanisms of human children. The specific cognitive constraints imposed on the process of learning through cultural transmission have then over time become "fossilized" in the languages of the world as linguistic universals.

Returning to the question of whether language or culture came first, it would seem that the linguistic adaptation account of language evolution is at least compatible with Donald's culture-first scenario. Nonetheless, the approach to language evolution presented here also suggests a possible third alternative, one in which language and culture evolved together in a spiral fashion, feeding on each other and constrained by the learning and processing mechanisms of early hominids. In this view, the issue of culture first or language first is of less importance. Instead, we can focus on the interplay between culture and language in hominid evolution, and how this interplay may have been constrained by the various cognitive mechanisms in the evolving hominid brain.

19.9 A Possible Confusion between Mimetic and Memetic
Susan Blackmore on Donald

The terms "meme" and "memetics" were used many times at the Royaumont conference on imitation, and they sound very similar to Donald's terms "mimesis" and "mimetic," so it may be helpful to distinguish between the two.

"Meme" was coined by Dawkins to give a name to a replicator that is copied by imitation. As examples of memes, he suggested "tunes, ideas, catch-phrases, clothes fashions, ways of making pots or of building arches" (Dawkins, 1976/1989, p. 192) and included scientific theories, poems, chain letters, and religious doctrines. He derived the term itself from the Greek word *mimeme* meaning "that which is imitated," abbreviating it to a monosyllable that sounds a bit like gene. This choice itself was, as we now know, a highly successful meme. So the core meaning of "meme" is that which is imitated.

By contrast, Donald's (1991) term "mimetic" is part of his three-stage account of the evolution of human brains, culture, and cognition. These three stages are (1) the acquisition of mimetic skill; (2) lexical invention—the creation of words, spoken language, and storytelling; and (3) the externalization of memory, including symbolic art and the technology of writing, both of which allowed humans to overcome the limitations of biological memory.

We can easily see that the terms are very different. Donald's "mimetic" is closer to "mime" than to imitation, and he includes "gesture, body language, and mime, any of which can communicate an intention quite effectively, without words or grammars." He also includes representing an event to oneself as a form of mimesis and describes mimesis as "a necessary preadaptation for the later evolution of language" (Donald, 2001, p. 263). So mimesis includes internal representations and excludes language, storytelling, and writing. In contrast, memes are anything that is copied from person to person; in the modern world, the vast majority of memes are words and combinations of words, both written and spoken.

These are the most obvious differences, but if we pursue them a bit further, we find that these two terms exemplify two fundamentally different approaches to human evolution. First, for Donald "mimesis rests on the ability to produce conscious, self-initiated, representational acts that are intentional but not linguistic" (1991, p. 168). This means that mimesis is essentially a symbolic or representational act. This is not implied in memetics. Memes are simply the actions, behaviors, or statements that people make, and the artifacts they build. If these memes can succeed in being copied, they will thrive, and there is no requirement for them to be symbolic or representational, let alone conscious.

A second difference concerns the origins of variation and creativity. Donald argues that, as a purely replicative skill, imitation cannot generate much cultural variation and plays a limited role in cultural evolution, that it is more a transmission device than a creative one. This more traditional view is completely reversed by the memetic view, which might be stated like this: Imitation is the copying mechanism that made cultural evolution possible. Errors in imitation provide one source of cultural variation, recombination of old memes to make new ones provides more, and selection from the variants completes the process. Memetic evolution is a creative process in exactly the same way that biological evolution is, and depends

on imitation as its mechanism of heredity. In the memetic view, imitation is the key to all of human creativity.

Finally, the two approaches differ over the question, Who benefits? (Dennett, 1995). The main point of memetics, as conceived by Dawkins, was to illustrate that memes as well as genes can have replicator power. He argued that we should get out of the habit of always appealing to biological or genetic advantage because there may be other replicators that also drive evolution for their own advantage. Memetics is therefore the study of how the interests of memes affect human evolution and culture. By contrast, Donald sees mimesis as an adaptation, following the traditional view that the skill of copying gestures, actions, and mimes is of biological advantage to the people who acquired it, rather than being of advantage to the gestures, actions, and mimes themselves. We are far from knowing which theory, if either, is correct, but it may be helpful to realize how very different they are.

19.10 Imitation as a Tool of Cooperation and Manipulation
Paul Seabright on Sugden and on Gambetta

These two chapters explore in different ways the relevance of imitation for the social sciences. Gambetta asks about conscious, deliberate imitation, and specifically about the kind of imitation that involves deception, as opposed to the kind that transmits knowledge, skills, or forms of behavior from one person to another with the awareness or at least tacit consent of the former party. It is important to focus on the deceptive case precisely because much recent work on imitation stresses, for good reasons, its constructive and productive character. Indeed, imitation has increasingly come to be seen as the source of much of mankind's greatest creativity. Knowledge is, after all, typically expandable. When good ideas are imitated, they do not usually cease to be good ideas; on the contrary, they can thereby become accessible to many more people. Another way to put this is that knowledge is the kind of resource that is scarce only because of the costs of transmission, and a capacity for imitation (which lowers these costs) makes knowledge less scarce. However, this enthusiasm for imitation (which the chapters in this volume should do much to encourage) should not obscure the fact that imitation sometimes serves as a weapon in the struggle for *other* resources that may be very scarce indeed.

These are not inconsistent points of view. Over the long period of human history, the cumulative character of knowledge has irrevocably fashioned our culture; current knowledge builds on past knowledge in ways

that only our remarkable capacity for imitation can explain. This complementarity often turns those who have knowledge into allies, since they have an interest in cooperating. The most sharp-witted survivors, though, have always realized that knowledge is also power, and that the scarce resources of food, military strength, and (for males) access to the favors of females could depend on knowing things that others do not. This predicament turns those who have knowledge into rivals, and Gambetta's chapter reminds us of the multiple baroque manipulations to which such rivalry can dispose us. These manipulations give color and energy to our social life, but they can also be deeply destructive of human cooperation. We already know that cooperation in general is central to human society, but that at the same time it is highly fragile; cooperation specifically in the sharing of knowledge illustrates this duality very well.

Sugden's chapter is about the kind of imitation that turns those who have knowledge into allies—the spread of good ideas through imitation, which may or may not be conscious. Specifically he asks whether rational behavior in the sense that an economist might recognize could be the product of memetic imitation. Could we have learned to be rational by imitating others—not in the sense that we have entered a deliberate and laborious apprenticeship with rationality as the outcome, for that would have required a strong commitment to rationality from the start—but rather in the sense that rationality could have invaded our brains by sheer force of charm? Perhaps this is a question that economists are likely to find more compelling than other people, since others may feel that rationality of a kind must have been the prerequisite for our capacity and compulsion to imitate in the first place (this is central to the arguments advanced by Michael Tomasello, 1999, for instance).

Sugden shows first that genetic evolution could not be guaranteed to produce a tendency for rational behavior, since genetic evolution selects combinations of genes rather than single genes, and some genes causing maladaptive behavior in the homozygotic form could cause relatively adaptive behavior in the heterozygotic form. Next he shows that memetic evolution could not be guaranteed to do so either, since if memetic evolution proceeds by bilateral imitation, the resulting behavior patterns may not display transitivity. Both of these conclusions are impeccably demonstrated, although they leave me wondering what exactly the evolutionary arguments under assault were supposed to show. We are not given reasons for thinking that irrational behavior is *in fact* favored by genes that have favorable consequences in the heterozygotic form, nor are we given reasons for thinking that intransitive behavior patterns are empirically likely

because of inconsistencies induced by bilateral imitation. So Sugden's arguments appear to show that rationality was not guaranteed to develop by genetic or memetic evolution, but they are quite compatible with its having in fact developed by one of these means. Evolutionary explanations are rarely undermined by objections that there was nothing inevitable about the sequence of events to which they appeal.

What kind of factual considerations might we look for to help settle the argument? Memetic evolution could indeed display a strong tendency toward transitivity if the factors that made one meme more likely to replicate than another were not purely random but were linked to a widespread prior disposition to favor certain kinds of meme on the part of the brains between which they replicate. Such a prior disposition, to be sufficiently widespread, would have to have been favored by genetic and not just memetic evolution. Does this mean that the memes must have replicated merely in the interests of the genes, and that the memetic explanation is therefore redundant? Not in the least. An analogy with the logic of genetic evolution may help to explain why.

All interesting Darwinian explanations do more than just point out the truism that the most successful replicators become disproportionately represented in any population. They link certain identifiable environmental conditions to the evolution of replicators with identifiable characteristics that enable the replicators effectively to exploit those conditions for their replication. Thus polar bears evolved in the arctic and not in the temperate zones because of the adaptive value of white camouflage on snow and ice, and gray tree moths became disproportionately represented as the level of atmospheric soot rose during the industrial revolution. In both cases an identifiable environmental condition (the presence of snow or soot) is linked to some characteristic of the phenotype (white fur, gray wings). Similarly, an interesting explanation of some instance of meme evolution could not just confine itself to saying that since a particular meme is now widespread, it must therefore have successfully replicated. It would need to explain why the environment in which the meme had evolved was more favorable to that particular meme rather than some putative rival. This does not imply that the meme is evolving in the interests of that environment or indeed in any interest other than the meme itself. It just implies that the environment favors some memes over others, just as an ecological environment favors some genes over others. Thus an environment characterized by endemic malaria favors the evolution of sickle-cell anemia, although no one would suggest that this anemia evolves "in the interests of" malaria.

What is the environment in which memes have evolved? It is the brains, bodies, and behavior of *Homo sapiens sapiens*, initially as these had evolved prior to the invention of agriculture some 10,000 years ago. This environment has itself been subsequently evolving, mainly under the influence of memes. The purely genetic component of this environment has changed little, but this fact has clearly not constrained the evolution of memes very narrowly, because the behavior of modern *Homo sapiens sapiens*, interacting in a world of millions of strangers, is utterly different from our ancestors' behavior only 10,000 years ago. Nevertheless, genetically determined predispositions constrain the evolution of memes in recognizable ways. For instance, consider behavior that involves children leaving their mother to rush trustingly up to strangers. In a world in which strangers regularly do violent things to unrelated infants, which very probably characterized our hunter-gatherer ancestors, this would not be a successful meme (nor would a gene for this behavior be a successful gene, but that's a different point). The meme would not replicate successfully, for two distinct reasons. First, children who bear it would die, thereby limiting their ability to pass on the meme. Second, other children observing the fate of those who bear the meme would choose not to imitate this behavior (because of a highly adaptive genetic predisposition not to put their lives gratuitously at risk). In a world in which strangers do not regularly behave violently toward unrelated infants, the meme would stand more of a chance, although this might not be enough to favor it over a meme for more cautious behavior.

Put simply, the fact that people imitate opens the door to memetic evolution, but they do not imitate indiscriminately. Some of the behavior that thereby evolves could nevertheless be quite irrational. For instance, it seems likely that a tendency to accept (or at least to be favorably disposed toward) the opinions of the people who shout the loudest would have been quite adaptive during the Pleistocene era. The loudest shouter in the group most of the time would probably have been the person whose protection it was best to seek and whose opinion it was safest to follow. It is therefore plausible that memes are favored by characteristics (such as the loudness or more generally the conspicuousness with which they are expressed) that are unrelated to any other dimension of their "reasonableness." In the modern world, accepting the opinions of those who shout loudest may well be foolish in the extreme, both individually and collectively, but a tendency to do so may be part of our Pleistocene heritage it is now impossible to escape.

Whether in fact human beings have evolved to be economically rational is therefore an empirical question (the best answer going is probably "up to

a point," as Evelyn Waugh might have put it). To the extent that they have, there has certainly been nothing inevitable about this, as Sugden's chapter convincingly demonstrates. And as Gambetta's chapter points out, such rationality can be deceptive and manipulative as well as cooperative. These two stimulating chapters remind us that human rationality underlies both our species' greatest triumphs and our most destructive excesses.

19.11 Proving Rationality
Mark Greenberg on Sugden

Conventional economic theory assumes that economic agents are rational decision makers in the sense that they act as if they were trying to maximize some one-dimensional criterion. A well-known body of experimental work has increasingly shed doubt on the assumption that human beings are rational in this sense, however. Recently, some economic theorists have tried to justify the assumption of rationality by appealing to a cultural analogue of natural selection. Robert Sugden's interesting chapter is highly critical of this strategy—*the evolutionary strategy*, for short. Indeed, some of Sugden's remarks might be read to suggest that Darwinian theorizing about cultural evolution is a sterile enterprise of "manipulating tautologies about replicators" (vol. 2, ch. 15, p. 316) that can have no relevance to the empirical question of whether human beings are rational. On this reading of Sugden's chapter, the evolutionary strategy is a failure, and, more generally, a Darwinian theory of cultural change—*meme theory*—can have no explanatory value. Sugden's arguments, however, do not warrant this dismissiveness toward the evolutionary strategy or toward meme theory. A better way to read his chapter, I suggest, is as a plea for empirical investigation *in addition to* relatively a priori theorizing. The larger interest of the chapter is less its criticism of a particular application of meme theory than its suggestiveness for further work in meme theory generally. Contrary to the implication of some of his remarks, Sugden's chapter itself illustrates that theoretical work on Darwinian theories of cultural change can fruitfully complement empirical investigation.[16]

19.11.1 The Evolutionary Strategy and Sugden's Response

Sugden focuses on a version of the evolutionary strategy, developed by Ken Binmore (1994, 1998), that relies on Richard Dawkins's (1976/1989) analogy between cultural and biological evolution. Memes that are not good at influencing human behavior in a way that has the effect of propagating themselves will tend to be outcompeted by memes that are. Thus, according to the Dawkins-Binmore line of thought, in the long run, the memes found in our minds will tend to be ones that are very good at influencing their carriers to behave in a way that spreads those same memes. As a result, human beings will tend to act as if they are trying to spread the memes they carry—thus satisfying the assumption of conventional economic theory that economic agents act as if they are trying to maximize some one criterion (pp. 303–304).

Sugden's argument centers on two examples. The first involves a diploid species in which the action the agent chooses depends on the combination of genes the agent carries. Sugden shows, that under the right conditions, an action that does not have the greatest reproductive success can continue to be chosen at equilibrium (and can even continue to be chosen more often than actions with greater reproductive success). In the second example, a meme's likelihood of being replicated depends on the frequency of other memes in the population, with the result that there can be continuous cycling of the proportions of each meme and thus of the decision probabilities for each action. Sugden draws from his examples the conclusion that selection does not necessarily induce rationality *at the level of actors*. In equilibrium, Sugden argues, though *replicators* will behave as if they are trying to maximize their own reproduction, the consequence need not be behavior that appears rational from the perspective of the actors (pp. 310ff; 312ff).

19.11.2 How Well Do Sugden's Examples Address Binmore's Strategy?

In this section, I raise three questions about how well Sugden's examples are adapted for their purpose, and I also mention a concern about Binmore's strategy. First, Sugden's examples do not seem to squarely address the issue that is crucial to Binmore's evolutionary strategy—whether the consequence of Darwinian evolution will be that agents will act as if they are trying to maximize a single criterion—most relevantly, the reproduction of *the replicators they carry*. With respect to the diploid-species example, Sugden points out that although "it is as if the surviving *genes* are maximizing their own replication" (p. 312), "biological natural selection does not necessarily favor *actions* that maximize the reproductive success *of actors*" (p. 311). The relevant question, however, is whether agents maximize the reproduction of the genes or memes they carry, not whether they maximize their own reproductive success (in the sense of having the most descendants). Similarly, the second example shows that where the choices

16. Sugden (2001), which I read after writing these remarks, suggests that, at least at that time, he would have been sympathetic to my preferred reading of his chapter. Sugden confirms that this reading is what he intends (personal communication).

available to an agent are characterized in a way that is independent of the replication of the memes the agent carries, the result of an evolutionary process can be intransitive preferences among those choices (p. 314). Again, however, the relevant question is whether the result of evolution will be that agents will act as if they are maximizing the spread of the memes they carry. We cannot get a clear view of that question by looking at how agents behave with respect to choices that are characterized without regard to the replication of memes. Sugden's examples do not allow clear evaluation of the relevant question because it is not clear in the examples what would count as the agents acting so as to maximize the reproductive success of the replicators they carry.

Second, for a different reason, Sugden's examples are not well designed to address whether an analogue of natural selection will have the consequence that agents will behave as if they are maximizing the spread of the replicators they carry. As noted, Dawkins's idea is that given variation in replicators, there will be evolution in the direction of replicators that are better at inducing the conditions for their own copying. Thus, the memes that are around in the long run will be ones that are relatively good at getting themselves copied. Sugden's examples, however, exclude by stipulation the possibility of new genes or memes coming into existence. And the examples are constructed in such a way that none of the original genes or memes can, in the long run, be more successful at reproducing themselves than others.

Third, Sugden's examples assume that the structure of memetic reproduction, whatever it may be, is fixed for all time. But as Dawkins has argued, what is fixed in the short run may not be fixed in the longer run (1982, pp. 34–35). Thus, not only may new replicators emerge, but the fundamental mechanisms of replication can themselves be modified by evolution. The history of biological evolution includes many examples of this, including the development of multicellular organisms and sexual reproduction. We thus have very general empirical grounds for being cautious about the idea that the mechanisms by which replicators reproduce might happen to be fixed in a way that obstructs the operation of selective forces.

I also want to raise a concern about the Binmore strategy that Sugden does not mention. In normal cases, the actions we take cannot favor some of our genes over others. Our genes are all in the same boat—except for meiosis, over which we have no control. Matters are very different with our ideas. We can choose actions that will predictably spread some of our ideas more than others. (Also, the ideas we carry change from moment to moment.) Thus, even if cultural evolution operates in a way that is parallel

to biological evolution, it is not clear that the consequence will be that humans will behave rationally in the relevant sense—i.e., as if they are trying to maximize a *one-dimensional* criterion of success.[17]

19.11.3 Empirical Questions and A Priori Theorizing

The most that Sugden's examples could show is that the evolutionary strategy depends on empirical assumptions; without an empirical showing that those conditions are not satisfied in the relevant cases, he could not hope to refute the evolutionary strategy. Now he is certainly correct that whether Darwinian evolution will occur (and whether it will have the claimed consequences for human rationality) depends on empirical conditions, in particular on "what memes actually are and how they in fact replicate" (p. 316). An important objective of theoretical work on Darwinian evolution, in both the biological and cultural domains, has been understanding the conditions needed for Darwinian evolution to occur or to take various directions (see, e.g., Gil-White, vol. 2, ch. 16). Indeed, as Sugden notes, economists who have appealed to an analogue of natural selection have hoped "to argue that rational-choice theory applies only in situations in which the relevant selection mechanisms are active. That might make it possible to define the domain of the theory in such a way as to include many forms of behavior in markets while excluding many laboratory experiments" (pp. 302–303).

Thus, it is actually important *to the evolutionary strategy* to claim that the relevant selection mechanisms operate only when certain empirical conditions are satisfied. It is therefore puzzling that Sugden thinks that his chapter argues "that this [evolutionary] strategy, in the form in which it has been used so far in economics, fails" (p. 301).

Some of Sugden's remarks seem to suggest that since it is an empirical question whether human beings are rational, it is pointless to engage in theorizing about cultural evolution. In the concluding words of his chapter:

> Whether human decision-making behavior satisfies the rationality postulates of conventional choice theory is an empirical question. If it does, any explanation of that fact must depend on empirical propositions about how the world really is. Trying to find an explanation by manipulating tautologies about replicators is to attempt what is logically impossible. (p. 316)

Sugden is certainly right that empirical investigation is *necessary* to determine whether the conditions for the right kind of evolution are satisfied. It

17. Sugden (2001) makes a similar point.

does not follow, however, that empirical investigation is *sufficient* or that relatively a priori theoretical work cannot be helpful. After all, Sugden's chapter itself engages in a priori analysis that sheds light on the empirical conditions for Darwinian processes to take particular directions. Without such work, empirical investigators would not know what to look for.

19.11.4 Conclusion

Perhaps what Sugden should conclude is not that economists should give up the attempt to use the evolutionary approach. Instead, theorists have two tasks. They need to work out the conditions under which a Darwinian process would ensure rational behavior. And they need to investigate empirically whether those conditions are satisfied in the relevant cases. The first task is largely a nonempirical one. The second task is an empirical one, but it cannot be carried out without theorizing that identifies the conditions to be investigated.

Answering empirical questions tends to require empirical investigation. Darwinian explanations are no exception: they depend on empirical premises. It does not follow, however, that there is no explanatory work for a Darwinian theory of cultural evolution—that it is nothing but "the manipulation of tautologies." Sugden's chapter itself is an a priori exercise in meme theory that is suggestive of potential directions for empirical work.[18]

Acknowledgement

I am grateful to Harry Litman for valuable discussion and to Robert Sugden for helpful comments on the final draft of these remarks.

19.12 Even Deeper Misunderstandings of Memes
Susan Blackmore on Gil-White

Gil-White describes a memetics that I do not recognize. I will comment on just two of his main points.

First, he rejects three central concepts for memetics: replication, imitation, and selfish memes. He regards replication as a red herring, but he defines replication to mean copying with 100% fidelity and a replicator as something that is copied perfectly. This is not the usual definition of a replicator, and there could be no memetics if it were. In fact, the term

18. See relevant discussions in Gil-White, vol. 2, ch. 16; Greenberg, vol. 2, ch. 17; and Chater, vol. 2, ch. 18. ED.

"replicator" was coined by Dawkins (1976/1989) in terms of the very evolutionary process that Gil-White describes: universal Darwinism. Dennett (1995) refers to this general process as the evolutionary algorithm. If you have variation, selection, and heredity, you *must* get evolution. The information that is copied is called the replicator. Dawkins then invented the term "meme" to provide an example of a replicator other than the gene; one that is copied by the process of imitation. Gil-White claims that Dawkins insists on replication on the grounds that perfect copying is the only thing that can set Darwinian processes in motion. Not only is Gil-White wrong about Dawkins, but if replication is perfect, there is no variation and hence there can be no evolution—whether genetic, memetic, or any other kind.

Note that I prefer to use the original term "variation" here because variation is general to all evolutionary processes whereas "mutation" is a term specific to genes. I fear that Gil-White misleads us by talking about mutation in memes.

This highlights a major problem with Gil-White's analysis, which is that he relies heavily on analogies between memes and genes when these may not be warranted. He claims that insistence on a close genetic analogy reflects a misunderstanding of evolutionary genetics and regards Dawkins, Dennett, and myself as pushing the analogy too far. But it is he who insists on this analogy, not memeticists.

I want to make this point as clear as possible. Memetics starts, not from an analogy between memes and genes, but from the recognition that both are replicators (information copied with variation and selection). Beyond that, the two replicators work in very different ways. Genes have been evolving for several billion years and are now copied with extremely high fidelity. Memes have been evolving for only two or three million years at most, and are copied by all the messy, inaccurate, and variable processes of imitation that we have been learning about at this conference. This difference is crucial to understanding how memes work, and it does not undermine the point that both memes and genes are replicators. Understanding replication by imitation is the heart of memetics. Replication cannot be a red herring, for there can be no memetics without it.

Gil-White's second red herring is imitation. Again he defines imitating as making exact copies. From everything we have learned at this conference, it is clear that imitation rarely, if ever, produces exact copies of behaviors, and memetics must be based on this reality. Since memes are defined as the information that is copied by imitation, imitation cannot be a red herring for memetics.

Finally Gil-White rejects the notion of selfish memes. However, it might be helpful to point out that the concept of selfish replicators falls straight out of the idea of the evolutionary algorithm. Once you have a replicator being copied with variation and selection, then that information will get copied whenever it can, regardless of the consequences. So memes are selfish in exactly the same sense as genes are. This does not mean that they have selfish plans or intentions, but merely that they will spread whenever and however they can. This notion of selfishness is intrinsic to the idea of the meme as a replicator, and is the basis on which memetics can be used to make predictions different from those made on the basis of adaptations that favor genes. If this is a red herring, then there is nothing left of memetics.

I will skip now to the end of Gil-White's chapter. Here he claims (quite rightly) that meme content is not everything. The problem is that he accuses me of saying that meme selection occurs solely as the result of meme content, which I do not. Moreover, in arguing against what he takes to be my views on memetic drive, he quotes a section from my book that is not actually about memetic drive.

Let me be clear about memetic drive. I think that most memeticists would agree with what I have said so far in this commentary, but they may not agree that memetic drive occurs or that it can, as I have suggested previously, account for the rapid expansion of the human brain or our capacity for language. My hypothesis, put very briefly, is as follows. Once our ancestors were able to imitate, a new evolutionary process was let loose in which memes competed to be copied. The successful memes then changed the environment in which genes were selected, giving an advantage to genes for the ability to copy the currently successful memes. By this process, brains became successively better at copying the memes that had been successful in the memetic competition. In other words, genes were forced, to some extent, to track the direction of memetic evolution.

There are perfectly legitimate theoretical questions about whether this process could work, and empirical questions about whether it actually happened. The process has been successfully modeled, and also compared with better-known versions of gene-culture coevolution (Higgs, 2000; Kendal & Laland, 2000). However, what is important here is that memetic drive depends on heuristics such as copying, or mating with, the best imitators, which are related to those described by Gil-White. Without such bias memetic drive cannot work. The memetic drive hypothesis may be false, but it is not, and cannot be, based on the idea that only content determines which memes are selected. I hope these very brief comments may help to clear up some fundamental misunderstandings about memetics.

19.13 Can Memes Meet the Challenge?
Susan Blackmore on Greenberg and on Chater

Chater and Greenberg, in their different ways, describe the challenge faced by any memetic theory of cultural change. Chater points out how counterintuitive the idea is. Indeed it is. As he puts it, meme theory views cultural complexity as generated by the blind watchmaker of nonpurposive selectional forces rather than by the sighted watchmaker of conscious humans and their goals. Greenberg sets this up as goals versus memes, or as humans' deliberate pursuit of their conscious goals versus competition between memes.

The challenge to meme theory, then, is to show that at least in some instances, Darwinian forces with memes as the replicator can better explain cultural complexity than can intelligent, purposeful design by humans. It is important to stress at once that no meme theorist is likely to reject human goals as irrelevant to memetic evolution. The interesting question is what role they play. Are human goals the ultimate design force for culture (goal theory) or are they just one of many factors in a Darwinian design process acting on memes (meme theory)?

Analogies between genes and memes must be treated with caution, but we may usefully consider the role of animals' goals in biological evolution. Imagine a bird of prey whose goals include staying alive, guarding its territory, and feeding its chicks. These goals do not, on their own, design anything. Yet their pursuit has many design consequences, including the evolution of defenses or camouflage in the prey, improvements in the predator's hunting skills, and many unintended effects on genes in other organisms, such as the moss used for lining the predator's nest, the parasites that take up residence there, the food eaten by the prey, and so on. We can best understand the overall design of this bird by thinking of the ultimate driving force as a Darwinian process in which genes compete to be copied. In this process, the goals of the bird are relevant, but they are not the ultimate designer.

Consider now a favorite example of meme critics, the design of an aircraft. Surely, say the critics, this is completely different from the case of the bird, for the aircraft was designed by human intelligence and foresight in order to fulfill conscious goals. My response is that the goals are relevant,

but that we get a better overall understanding of aircraft design by taking the meme's-eye view. In this view, memes such as wing shapes, engine types, seating plans, window construction, food storage, and safety features all compete to be copied. The numerous human designers are meme machines who, through their intelligence and education, are able to recombine memes to make new designs. Their many designs then compete to be brought to fruition, with many being dropped. The few that are finally built then compete in world markets and even fewer succeed for reasons that include fluctuations in the cost of oil, unexpected terrorist attacks that increase people's fear of flying, birds that accidentally get sucked into jet engines, the evolution of the bacteria that thrive in warm food, and the patriotism of people who want their national flag painted on the tail fins. In this process, the goals of the human designer are essential, but they cannot alone explain the final design of the plane.

The analogy is not close because genes and memes are copied and selected by such very different mechanisms, but I hope it is close enough to make this simple point—that in meme theory human goals are not treated as irrelevant, but are given the same status that the goals of plants and animals are given in biological evolution. That is, they are just one of many factors contributing to design by selection.

If we accept this role for human goals, can meme theory meet Greenberg's challenge and in his words, show that an appeal to an analogue of evolution by natural selection is the best explanation of cultural evolution? In the ambitious sense of providing a complete theory of cultural evolution, meme theory is very far from achieving this goal, but in limited domains it has already done so. A good example is the evolution of religions or, as Dawkins (1976/1989) calls them, "viruses of the mind."

In their adherence to religion, people invest precious resources in building temples and mosques. They spend time reciting scriptures and singing hymns. They burn offerings and pour away oils. They mutilate their children's genitals, causing them pain and disease. They wage wars in the name of religion and even kill themselves. And what is the role of humans' deliberate pursuit of their conscious goals in all this?

If asked, religious people might say that they wish to serve God; to enter into communion with spirit; to be a better Muslim, Jew, or Christian; or to attain life after death, but these goals are themselves derived from the religions and cannot explain the design of those religions. Meme theory takes the viewpoint of the religious memes themselves and investigates how and why they have succeeded in getting into people's behavioral repertoire and being passed on to others. The major religions are seen as memeplexes built

around instructions to pass on those memes (teach your children, pass on the good news). Obedience is obtained by a mixture of immediate benefits (a sense of belonging, or aesthetic pleasure) and protected by untestable threats and promises (hell, heaven, and eternal damnation). These religions therefore out-compete other memes and so persist. Human goals were both exploited by those memes and redesigned by them. No sighted watchmaker was needed.

A more modern example is the design of the Internet, with its high-fidelity copying and massive storage capacity. From a memetic perspective, the whole system is a rapidly evolving product of coevolution between memes and their new copying machinery, with human goals being just one factor in selection.

Meme theory is a long way from fully meeting the challenges that Greenberg and Chater raise, but it has made a start. The implication is that human goals are part of the world in which memes compete and evolve, while the ultimate designer of culture is the Darwinian process of memetic selection.