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SOCIAL PSYCHOLOGY AND THE COMIC-BOOK SUPERHERO: A DARWINIAN APPROACH

Abstract. Why is the comic-book superhero such a persistent topic of cultural representation? Citing Dutton's evolutionary aesthetic, we argue that comic-book superheroes persist because they offer a cultural means of negotiating the gap between the small group size that human beings have evolved a cognitive architecture to deal with, and the much larger group size that is entailed by modern social arrangements. This position implies four predictions: the superhero should (1) exhibit punitive prosociality, (2) be supernatural or quasi-supernatural, (3) be minimally counterintuitive, and (4) display kin-signaling proxies. These predictions are tested against seventeen superhero figures from various comic-book universes.

One of the more compelling features of Denis Dutton's *The Art Instinct* is its theoretical parsimony. Utilizing what essentially amounts to one explanatory principle—that of Darwinian selection—Dutton advances a theory of aesthetics that is at once general enough to account for cross-cultural variations in artistic production and sufficiently nuanced to promote insights into individual artworks. In doing this, Dutton's work could not offer a greater contrast to some of the more vocal trends in contemporary aesthetic theory, where ponderous theorizing and rebarbative jargons have violently opposed the idea—otherwise so modest—that aesthetic activities might draw on the evolved capacities of the human imagination. On its own, this is enough to mark

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The Art Instinct as a seminal contribution to the philosophy of art; but its value does not end here.

Given that evolutionary theory is itself an ongoing intellectual project, Dutton's approach necessarily lends itself to extension and revision as new discoveries are made about the human cognitive endowment. Indeed, this engagement is precisely what he proposes when he invites investigators to "strike out in the experimental corroboration or disconfirmation of ideas thrown up by describing the evolutionary roots of aesthetic taste."[1] There can be little doubt, then, that *The Art Instinct*, on grounds of both economy and extendibility, offers a particularly useful framework for the evolutionary analysis of cultural representations.

In the present essay, our goal is to exploit precisely these features of Dutton's work and to investigate an area that, though gestured toward in *The Art Instinct*, is not directly dealt with—namely, popular culture. For Dutton, it is self-evidently the case that a Darwinian approach to culture cannot just address itself to "high" art; it should also "enable us to talk more intelligently about the arc of art that moves from bedtime stories and *Sesame Street* through young people's fictions and into television soap operas, romance novels, and formulaic Hollywood movies" (*AI*, p. 236). Nevertheless, Dutton himself does not engage with these genres of aesthetic production; and while this has the happy outcome of keeping *The Art Instinct* to a portable size, it does point to a fertile area of inquiry that should reward a Darwinian approach.

In consonance with this, we propose here to investigate the phenomenon of the comic-book vigilante or superhero using the evolutionary approach advocated by Dutton. Specifically, we shall argue that this common cultural trope exhibits recurrent traits that can best be explained with reference to evolved intuitions concerning sociality and its maintenance. That is, we claim that there is a limit on the human ability to track social relationships beyond a certain threshold, and that when actual social demands exceed this threshold, symbolic activities come into play that seek to neutralize the epistemic gap between cognitive architecture and the demands that are placed on it. We suggest that the superhero phenomenon represents just such a symbolic activity, to the extent that the superhero is capable of visiting the norms of small-group sociality on groups that are vastly larger than humans have the cognitive resources to effectively deal with. Equally, we argue that the role of the superhero as moral enforcer results in certain characteristic traits (such as quasi-supernatural agency, minimally counterintuitive traits,

and kin-signaling proxies) that can best be explained with respect to cognitive mechanisms that deter free riding and facilitate prosociality.

In making these claims, we are conscious that we are working against the dominant trend in comic-book studies. Ever since Umberto Eco made the topic respectable in his 1972 essay "The Myth of Superman,"[2] the volume of critical commentary produced has expanded well beyond any easy reckoning. But this does not change the fact that the disciplinary orientation of comic-book studies is overwhelmingly historicist, in that its principal exercise consists of situating representations in an appropriate sociohistorical context.[3] This is a laudable undertaking, and we have no intention of denying its intellectual value as an activity in itself. Nevertheless, we do suggest that an exclusive focus on historical and political contingencies eclipses the deeper question of *why* the superhero figure should offer such cognitive traction for the social imagination. For this, we argue, insights are needed about how the human mind has evolved to monitor social relationships—insights, moreover, that are neither easy to come by nor self-evident.

Methodologically, our approach will be broadly empirical. Specifically, we will tabulate the characteristic traits of a large number of superhero representations, with a view to showing how, on aggregate, they confirm the predictions of our hypothesis. As this is a somewhat charmless exercise, however, we will supplement the raw data with an expository vignette that illustrates our claims with reference to one of the better-known superheroes—namely, Superman. Taken together, these expedients should not only revise our understanding of a persistent topic of popular representation but also usefully expand on Dutton's evolutionary account of human aesthetic activity.

I

Our contention in the present essay is that the comic-book superhero represents, in part, a cultural response to the cognitive problems engendered by large-group living. In maintaining this, we are led by the idea—articulated by Dutton (*AI*, pp. 109–18) but also advanced by Claude Lévi-Strauss[4] and Dan Sperber—that narrative represents an attempt to reconcile inexplicable or incompatible data with preexisting interpretive frameworks. According to this theory, which was given its most effective exposition in Sperber's seminal *Rethinking Symbolism*,[5] one of the tasks of counterfactual representations is to subject the problematic material to case-based reasoning, analogical substitutions,

and hypothetical scenarios until it is rendered amenable to cognition. Following this, our claim is that the stimulus for much comic-book fabulation derives from the persistent mismatch between the cognitive architecture that human beings evolved to deal with social interactions and their present-day social situation. As this argument requires some unpacking, however, we will use this section to expand on it before proceeding to an analysis of the data.

While it is a given that human beings are intensely social, it has become increasingly evident that there are rather modest limits to this capacity for sociality. In particular, one of the present authors (Dunbar) has argued that the positive correlation between cortex volume and group size in primates reflects the computationally intensive nature of tracking social relations.[6] In this view, there is an upper limit on how many stable social relationships an individual can usefully maintain over time. For humans, estimates of this number vary, but the median value that emerges suggests a figure of between 100 and 200 people (with the value of 150 having become known as "Dunbar's number"). This figure likely reflects the minimum number of individuals with which it would have been necessary to maintain an effective social network in the Upper Paleolithic, when the human cognitive system took its current form; but it is equally the case that many present-day social arrangements also gravitate around this number.[7]

Where this situation becomes problematic, however, is when human beings must assort in numbers significantly greater than the cognitive ceiling imposed by evolutionary selection. These circumstances can vary widely, but among the more obvious are hierarchical institutions such as organized religion, the state, and the military, as well as large urban settlements that have come to characterize most human societies.[8] In such a situation, failure to track social relationships exposes the individual to missed cooperative opportunities and retaliatory actions, both of which are capable of seriously compromising reproductive fitness.[9]

Thus, a dilemma emerges: on the one hand, evolution has selected for a cognitive architecture that is appropriate to the environment of evolutionary adaptedness; while on the other, shorter-term historical and social trends have, in certain situations, superannuated the effectiveness of this same architecture. This dilemma has many important ramifications, not least among which is the influence it plausibly had on the evolution of language as a cultural prosthesis for exchanging information about social relationships (the "gossip" hypothesis).[10] However, in the present context, our concern is less with language

than with higher-order cultural representations. Following Sperber, we argue that the mismatch between social circumstance and cognitive architecture cannot but form a nucleus around which symbolic activity accretes. Here, the idea is that human beings have a partially defective conceptual representation of the social world they inhabit (in that it requires greater social-tracking capacity than humans innately possess), and this defective representation—problematic in both the practical and affective spheres—calls forth symbolic strategies that seek to neutralize the epistemic anxiety it engenders. These symbolic activities can take a plurality of forms, but Sperber accounts for the general dynamics of the sense-making process in the following way:

> The symbolic mechanism has as its input the defective output of the conceptual mechanism. The symbolic mechanism deals in two stages with the defective conceptual representations that are submitted to it. Firstly, it modifies their focal structure: it shifts the attention from the statements describing the new information to the unfulfilled conditions that have made the representation defective. Secondly, it explores the passive memory in search of information capable of re-establishing the unfulfilled conditions. At the end of this process of evocation, information thus found is submitted to the conceptual mechanism which uses it together with the previously unfulfilled condition to reconstruct a new conceptual representation. The latter is the interpretation of the initial symbolic representation. The output of the symbolic mechanism thus serves as the input to the conceptual mechanism. In other words, the symbolic mechanism is a feedback device coupled to the conceptual mechanism. (*RS*, p. 141)

In some cases, this activity will be successful, to the extent that passive or long-term memory may throw up a precedent or analogue that allows for the defective conceptual representation to be repaired. In other cases—and we would argue that this is true of human representations of large-group sociality—no real-world solution is possible, and the process fails.

However, just because a defective conceptual representation may not lend itself to an actual solution does not rule out the exploration of hypothetical solutions, where background features of the world are imaginatively altered so as to dissolve the motivating problem. Indeed, it is quite possible that the more a defective representation defies cognitive integration, the greater the attempts made to neutralize or repair it through counterfactual means. This can be seen most obviously in

religious symbolism, where death—a state of being that cannot be coherently imagined—is correlated with vegetable and culinary transformations (in the symbolism of burial and cremation) that allow for the assertion of the counterfactual reality of the afterlife. In this way, the cognitive and affective anxiety associated with death is suspended by counterfactual fabulation—even if this solution can only ever be temporary, given that death represents a practical reality as well as an intellectual problem. Thus, problems in understanding or representing the world are spurs for symbolic elaboration, and if this elaboration cannot *actually* resolve the problem, it is perfectly capable of offering *hypothetical* resolutions by way of counterfactual scenarios.

This, then, allows us to come back to the issue of sociality. Like death, the human problem of modeling large-group sociality cannot be practically resolved through symbolic fabulation, given that the human cognitive endowment can only be altered over evolutionary timescales. Nevertheless, since this persistent problem has been a concomitant of the human condition at least since the advent of the earliest cities, there should be extremely strong incentives to take the evolutionary "shortcut" of exploring hypothetical solutions in the counterfactual social sphere. While these solutions may not resolve the problem, they would offer at least a temporary reassurance that the mismatch between human abilities and human circumstances does not represent a necessary condition of existence. In consonance with this, we offer a prediction: cultural processes should actively produce counterfactual representations that make large-group polities subject to small-group norms.

As already stated, we nominate comic-book literature as just such a cultural process. Clearly, it is not the only one: literatures of the fantastic that counterfactually alter the conditions of existence are common in all cultures, implying that the superhero figure is just one instance of a class of cognitive adaptations. Nevertheless, we argue that both the popularity and the longevity of comic-book narratives point to their particular interest as insights into *modern* attempts to negotiate the shortfall between cognitive architecture and social environment. We concede that we have merely stated rather than justified this, and that more needs to be offered if the hypothesis is accepted as viable. Correspondingly, we will spend the remainder of the present section detailing the type of symbolic elaboration necessary for a cultural phenomenon to succeed in addressing the problem of large-group sociality. Given that these predictions will be annexed to an analysis of the vigilante or superhero

in the next section, we will also phrase them in terms of how they might manifest themselves in comic-book literature.

Prediction 1: Comic-book superheroes should punitively enforce prosociality. If there is a mismatch between social intuitions and social reality, then any attempt to mediate this mismatch will involve ratifying the intuitions in question as being, in the final account, reliable. In turn, this implies that the norms that legislate for small-group integrity will be elevated as universally binding. Clearly, the superhero figure presents just such a stable mechanism. Indeed, punitive altruism of the type associated with the superhero is already documented as a well-attested phenomenon in human behavior;[11] in the context of comic-book literature, we should expect to see it significantly amplified.

Of course, this leaves undetermined the precise *type* of prosociality that the superhero will enforce. In this connection, Alan Fiske[12] offers a useful point of entry into the question with his claim that human sociality can take four possible forms. For Fiske, these consist of *communal sharing*, where the social relations are determined on the basis of group membership (as in a family); *authority ranking*, where relations are calibrated on an asymmetric metric of relative superiority or inferiority (as happens in the military); *equality matching*, where obligation is calculated on the basis of favors received and given (as seen in turn taking and gift giving); and *market pricing*, where discrete interpersonal relationships are replaced with numerical expressions of fractional obligation or entitlement (as in a business contract).

Our expectation is that the superhero should, on aggregate, enforce communal sharing and equality matching, and oppose authority ranking and market pricing. This has less to do with any belief that a given mode is more "natural" than any other (Fiske convincingly argues that all societies use all four modes). Instead, we argue that authority ranking and market pricing lend themselves to extension beyond small groups in ways that communal sharing and equality matching do not. Specifically, both of the latter modes can work only if it is relatively easy to track group membership and social obligations—otherwise, an individual is liable to fall victim to false signaling and incur a reproductive disadvantage. Market pricing and authority ranking, on the other hand, either dissolve interpersonal obligation entirely or subordinate it to a role rather than a person, thereby formally, rather than psychologically, facilitating group expansion beyond the small-group ceiling. These two modes of sociality, then, are the ones most likely to emerge

as political forms appropriate to large groups. Correspondingly, social representations associated with them should stand out as problematic in the manner specified by Sperber and, as a result, engage the sense-making symbolic faculty. There are thus grounds to predict that the superhero will be prosocial in orientation, and that this prosociality will promote communal sharing and equality matching while discouraging exaggerated forms of authority ranking and market pricing.

Prediction 2: The superhero is likely to have quasi-supernatural traits. The main reason for expecting the superhero to possess supernatural or quasi-supernatural traits derives from work done on the close correlation between supernatural agency and norm enforcement. Commentators like Pascal Boyer,[13] Scott Atran,[14] and Jesse Bering et al.[15] have all argued that a belief in omniscient, invisible, supernatural witnesses is likely to have a fitness-enhancing effect by discouraging potentially risky defections from social norms. In the words of Atran, "Supernatural agents . . . function as moral big brothers who keep a constant vigil to dissuade would-be cheaters and free riders" (*IGWT*, p. 112)—a claim that is echoed by Bering et al. when they assert that spirits "reciprocate through positive life events for the self's prosocial actions and retaliate through negative life events for the self's anti-social actions" ("RADA," p. 365).

Though this claim is not meant to apply to all forms of supernatural agency, a survey by Bering and Dominic Johnson[16] suggests that this association between supernatural agency and norm policing is present in one form or another in most cultures. Thus, if one wishes to represent a prosocial, punitive agent in its most concentrated form, there are extremely strong incentives to include typically supernatural traits like omniscience, omnipotence, and indefatigability as part of the description. Certainly, these traits need not be represented as explicitly supernatural in origin—Sherlock Holmes, for instance, is a moral enforcer who is "omniscient" by virtue of his superior reasoning skills—but there can be little equivocation concerning their parahuman or superhuman nature. Hence, the attempt to subordinate large-group sociality to its small-group equivalent should be attended by a concern with the punitive dynamics of supernatural or quasi-supernatural agency.

Prediction 3: The superhero is likely to be minimally counterintuitive. This prediction is related to the foregoing one concerning supernatural agency. Work done in the epidemiology of representations has indicated that supernatural agents who deviate in one, and usually only

one, characteristic trait from intuitive ontological categories are most likely to persist in memory.[17] That is, empirical studies have shown that an agent such as, say, a talking dog or a moving statue (which are minimally counterintuitive with respect to our folk-psychological categories of "animal" and "object") is more memorable than either an unproblematic exemplar of the category or an overelaborate innovation on it. Correspondingly, there are good reasons to explain why successful and widespread representations of supernatural agency are often framed using minimally counterintuitive representations.

In the present context, the implications of this for the representation of the superhero should be clear: as a quasi-supernatural agent with no cognate in actual experience, those superhero representations that best reflect the dynamics of human memory are most likely to persist as an object of cultural elaboration. What we should see, then, in the figure of the superhero is a stable rendering in the category of "person," which is then supplemented with minimally counterintuitive characteristics and abilities—usually by way of an alter ego or secret identity.

Prediction 4: The superhero is likely to exhibit kin-signaling proxies. Ongoing research by three of the present authors (Dunbar, Machin, and Dávid-Barrett) involves identifying ways in which cultural prostheses can be used to expand the human ability to track large numbers of relationships. One such topic under investigation is the use of kin-signaling proxies. Here, the idea is that the cognitive load associated with processing relations of kin is less than that associated with processing relations with nonkin—largely, because kin schemas reduce the complexity of remembering and monitoring social networks. (That is, being able to reliably subordinate several people to the role of "brother," "sister," "cousin," and so on reduces the overall number of people that need to be tracked, given that genetic relatedness is, all other things being equal, likely to foster cooperative behaviors with people in these categories.) One consequence is that the overall number of social relationships an individual can maintain could, in principle, be expanded if nonkin can be reliably subordinated into the "kin" category. There are many examples of this process in operation, but perhaps the most visible can be seen in the nation-as-family metaphor so common in political propaganda.[18]

In the present context, the relevance of these ideas relates to the suitability of the superhero as an enforcer of social norms. Specifically, any concern with the maintenance of social solidarity on the part of the superhero should be concomitant with the promotion of pseudokin

relationships. That is, the superhero should signal kin-like behaviors (maternal, paternal, avuncular, etc.) to the reader, thereby validating his or her position as a trustworthy member of the social network, one who is not in need of sustained, cognitively expensive monitoring. Correspondingly, we argue that the superhero will evince a strong tendency to overcode nonkin relations with the forms and terminology of blood kinship—most often, by way of being an orphan who joins or forms an adoptive family or fraternal federation.

II

Though the inventory of superhero characters may (just about) be enumerable, the fact remains that they are individually implicated in a series of ongoing narratives that, for sixty or so years, have been produced on a weekly, monthly, or annual basis. Short of a research project devoted entirely to the task and consisting of multiple participants, no individual study can realistically do justice to this wealth of material. Given these constraints, we have chosen to focus on sixteen major superhero figures, which derive from various comic-book universes. In analyzing these figures, our approach has been to identify the recurrent features that remain stable over time, on the supposition that it is precisely these features that legislate for the cognitive value of the superhero phenomenon. While we have made every effort not to let our presuppositions affect our selection, the nature of comic-book publication means that two publishing houses—DC Comics and Marvel—are responsible for the lion's share of our data. We concede that this is not ideal; but at the same time, it can be argued that the success of both DC Comics and Marvel lies precisely in their ability to produce cultural representations that engage with basic intuitions on the part of the reader.

A second issue that emerges is how, exactly, we propose to evaluate the data. Given the number of representations involved, it is impossible to justify every operational decision we make concerning the nature of a given superhero. So, rather than merely present a dry chart of attributed characteristics, we will initiate the analysis by giving a descriptive vignette that illustrates the interpretive strategies we use in relation to the most well-known comic-book superhero: Superman.

Prediction 1: The punitive enforcement of prosociality. Superman is clearly involved in the punitive enforcement of social norms. Though his

imputed motto of "Truth, Justice, and the American Way" is not canonical (it was added in a 1950s radio serial), it is nevertheless apposite to Superman's role. Throughout his fictional existence, he apprehends various species of criminals, supervillains, enemies of the state, and antisocial individualists who threaten the social order. Significantly, however, Superman's moral charter derives, literally, from small-town America: he was raised in Smallville, Kansas, by a farming family, and he retains the mores of this community in his adult behavior. As Eco notes, "Superman carries on his activity on the level of the small community where he lives," and "if he takes trips to other galaxies with ease, he practically ignores, not exactly the dimension of the 'world,' but that of the 'United States'" ("MS," p. 22). In the present context, this is important, because it is precisely in a small community of this type that one would expect to find the most effective deployment of innate human social-tracking capacities (i.e., its size would not be much over the social tracking ceiling of 100 to 200 people). Equally, intact family structures and high levels of social solidarity would be instrumental in legislating for the communal-sharing and equality-matching modes of sociality identified by Fiske.

This situation changes markedly in the milieu in which Superman operates. As Clark Kent, he works as a journalist in Metropolis, whose very name announces it as an archetype of the big city. In this scenario, it is notable that, though Superman pits himself against a bewildering variety of villains, certain figures repeatedly emerge that can be readily aligned with specific modes of sociality. The most significant are Superman's two archnemeses: Lex Luthor and Darkseid. The former has two conflicting biographies, with one identifying him as a megalomaniac scientist and the other establishing him as a ruthless, amoral capitalist who is CEO of his eponymous company, Lexcorp. Both roles, clearly, announce him as an antisocial individualist; but it is notable that his corporate activities match up quite closely with the type of sociality associated with market pricing. Equivalently, the figure of Darkseid embodies the behaviors associated with authority ranking, the second "problematic" mode under discussion. Darkseid is explicitly modeled on Adolf Hitler, and his planet, Apokalips, reproduces many of the features of Nazi Germany. Notably, he also wishes to eliminate free will and subordinate the entire universe to his own personality. Self-evidently, this emphasis on authoritarian control brings to mind a negatively inflected form of authority ranking. Thus, Superman's principal antagonists reflect the

two forms of sociality that are most likely to challenge human cognitive architecture.

Prediction 2: Quasi-supernatural traits. Though Superman's powers are rationally "explained" as deriving from Earth's sun, there can be no doubting their quasi-supernatural nature. Among an evolving repertoire of abilities, the most stable include flight (allowing for omnipresence), X-ray vision and augmented hearing (allowing for near omniscience), inexhaustible stamina (signaling indefatigability), and superstrength (legislating for practical omnipotence). All of these traits are particularly relevant to the detection, prevention, and punishment of norm violations, in that they explode the notion of privacy and neutralize differences in relative power. Indeed, they approximate the "privileged epistemic access to the self's mental states" ("OL," p. 120) that Bering and Johnson identify as the key feature of punitive supernatural agents. To this extent, there is an abundance of evidence testifying to Superman's quasi-supernatural nature.

Prediction 3: Minimally counterintuitive traits. Superman, like many prosocial superheroes, is not identical with his public role as an enforcer of norms. He also has an alter ego in the form of the mild-mannered journalist Clark Kent. Indeed, given that he was raised as Clark Kent by his adoptive parents and only later became Superman, his superhero role can be considered to be parasitic on his ordinary human identity. Here, then, we have clear evidence of a minimally counterintuitive trait. That is, we have a stable folk-psychological category (that of "person") and a counterintuitive iteration on that trait ("person" plus hidden superhuman powers). As Eco observes, this places Superman in a long tradition of figures, ranging from "Hercules to Siegfried, from Roland to Pantagruel, all the way to Peter Pan" ("MS," p. 14), whose essential humanity is augmented by exceptional abilities. We submit that it is precisely this minimally counterintuitive iteration on the psychological category of person that provides for at least one aspect of the memorability of Superman.

Prediction 4: Kin-signaling proxies. Superman signals pseudokin relatedness in two distinct ways. The first of these is the most powerful kin proxy of all—that of identity. Superman, through his alter ego Clark Kent, invites identification from the (male) reader; he is "fearful, timid, not overly intelligent, awkward, near-sighted, and submissive. . . . Clark Kent personifies fairly typically the average reader who is harassed by complexes and despised by his fellow men" ("MS," pp. 14–15). In this sense, the representation of Superman plays off one of the least cognitively costly forms of social tracking in existence, which is tracking one's own actions and motivations. There is more, however. Superman, like almost all comic-book superheroes, is an orphan—indeed, he is an orphan from another planet. Thus, in terms of "true" kin relatedness, he falls about as far outside an actual human family as it is possible to get. Nevertheless, Superman is in every respect a dutiful son to "Pa" and "Ma" Kent, who in turn instill him with a strong moral purpose. As we will see, variants on this dynamic are present in nearly every superhero narrative, where an orphan or foundling reconstitutes the family (or joins a reconstituted family) that is composed entirely or largely of nonkin. In this way, Superman, like his peers, succeeds in offering extremely strong pro-kin signals that obviate the need for sustained social monitoring (i.e., they can reliably stand in as a kin surrogates).

Thus, considered together, the four predictions succeed in nominating several of the key characteristics of Superman. Hopefully, the discussion will also have made the dimensions of our approach a little clearer. Now the time has come to expand the field of analysis and look at a wider collection of superheroes. We will do this by tabulating the relevant data in terms of the four predictions and then discussing the broader trends that can be discerned therein. Ideally, this should vouchsafe our predictions as having a value that goes beyond the immediacy of the examples thus far given.

	Superhero Traits			
	Prosocial Orientation	**Quasi-Supernatural**	**Minimally Counterintuitive**	**Kin-Signaling Proxy**
Aquaman (DC Comics)	Initially opposed to the Axis powers (and hence authority ranking), his role expands to include antisocial individualists (pirates, threats to shipping lanes, etc.)	Superhuman strength; ability to communicate telepathically with all forms of sea life	Person, with the characteristics of a fish	Originally of royal birth, but brought up in pseudo father-son relationship by Arthur Curry (later versions of the story differ)
Batman (DC Comics)	Principal opponents (e.g., Joker) display psychopathy (null sociality) or authority ranking	Through technological, means abilities are amplified to superhuman level	Shares an alter ego with Bruce Wayne; person, but with special abilities	Orphan (parents murdered); has avuncular nonkin relationship with Robin
Beast (Marvel)	As part of the X-Men, challenges elitism based on genetic endowment (a form of authority ranking)	Animal-like characteristics, including superhuman strength and agility	Born Hank McCoy; person, but with animal characteristics (cited as most eloquent of X-Men, despite exterior)	Part of X-Men pseudofamily; also federated with the Avengers
Captain America (Marvel)	Emerged as explicit fictional response to fascism (and hence authority ranking)	Transformed into "perfect" human being by serum—strength, intelligence, stamina and agility all amplified	Shares an alter ego with Steven Rogers; person, but with special abilities	Both parents die at a young age; avuncular relationship with a number of nonkin sidekicks

Colossus (Marvel)	As part of the X-Men, challenges elitism based on genetic endowment (a form of authority ranking)	Superior strength due to ability to transform into metal	Shares an alter ego with Piotr Rasputin; person, but with object-like characteristics	Devoted to absent family in Russia; part of pseudofamily of X-Men
Cyclops (Marvel)	As part of the X-Men, challenges elitism based on genetic endowment (a form of authority ranking)	Blast of optic force	Shares an alter ego with Scott Summers; person, with characteristics of an object (specifically, a machine)	Orphaned, but raised in pseudo father-son relationship by Francis Xavier; exhibits "elder brother" behavior to other X-Men
Green Lantern (DC Comics)	Generic term for participant in the Green Lantern Corps, an intergalactic police force	Wide range of powers conferred by ring, including force-field generation, augmented movement, telepathy, telekinesis, shape-shifting, etc.	Person, but not bound by physical laws	Orphan; federated with nonkin in pseudobrotherhood
Hulk (Marvel)	Broadly prosocial, with a range of opponents (most notably, The Leader, who exhibits authority ranking)	Unlimited strength, agility, and mobility; immunity to damage and injury; resistance to psychic control	Shares an alter ego with Bruce Banner; person, with qualities of a natural phenomenon	From an abusive family, exhibits pseudokin relations to a large number of supporting characters
Human Torch (Marvel)	Broadly prosocial as part of the Fantastic Four; dedicated to scientific advancement and the defeat of evil	Flight; control of fire	Shares public alter ego with Johnny Storm	From broken home; brother of Invisible Woman; part of Fantastic Four pseudofamily

	Superhero Traits			
	Prosocial Orientation	**Quasi-Supernatural**	**Minimally Counterintuitive**	**Kin-Signaling Proxy**
Invisible Woman (Marvel)	Broadly prosocial as part of the Fantastic Four; dedicated to scientific advancement and the defeat of evil	Invisibility; ability to create force fields	Public alter ego shared with Susan Storm; person, but subject to different physical laws	From broken home; sister of Human Torch; part of Fantastic Four pseudofamily
Mister Fantastic (Marvel)	Broadly prosocial as part of the Fantastic Four; dedicated to scientific advancement and the defeat of evil	Genius-level intellect; exaggerated elasticity	Public alter ego shared with Reed Richards; person, with object-like traits	Leader of the Fantastic Four pseudofamily; exhibits pseudopaternal behavior
Mr. A (Witzend)	Challenges all norm-breakers who seek to escape purely personal accountability (i.e., a type of market pricing)	Quasi-omniscience by virtue of superlative detection skills	Shares alter ego with Rex Graine; person, with extreme skills	None in evidence
Nightcrawler (Marvel)	As part of the X-Men, challenges elitism based on genetic endowment (a form of authority ranking)	Ability to teleport; superhuman agility; partial invisibility	Shares an alter ego with Kurt Wagner; person, but subject to different physical laws	Orphan; part of X-Men pseudofamily

Phantom (King Features Syndicate)	Devoted to "the destruction of piracy, greed, cruelty and injustice"; most significant enemy is the Singh Corporation (representing a form of market pricing)	Extreme athleticism and martial arts skills; known as "the ghost who walks"	Shares an alter ego with Kit Walker; person, with seemingly supernatural powers (as evinced by name)	Has a family, but also involved in kin brotherhood with various indigenous tribes
Professor C. Xavier (Marvel)	As leader of the X-Men, challenges elitism based on genetic endowment (a form of authority ranking)	Genius-level intellect; telepathy; astral projection	Physically damaged person, with exaggerated mental powers	From broken home; engages in pseudopaternal behavior toward the X-Men
Spiderman (Marvel)	Challenges a range of villains; most prominently, the Green Goblin (amoral industrialist Norman Osborn), who evinces a form of market pricing	All the abilities associated with a spider, as well as precognitive abilities	Shares an alter ego with Peter Parker; person, with the characteristics of a spider	Orphan who is raised by aunt

III

As can be seen in the preceding table, our predictions are, on the whole, borne out by the data. With the one exception of Steve Ditko's Mr. A (who does not exhibit a kin-signaling proxy), every figure incorporates the four predicted traits. This is not to say, however, that the data were entirely as expected. In particular, we were surprised to find that market pricing ranked so low on the list of "problematic" modes of sociality, in that it is definitely present in only four cases, while authority ranking is present in all sixteen. This may well reflect the American bias in the selected material, to the extent that capitalism and its associated modes of behavior are, in cultural terms at least, less negatively marked than they may be elsewhere.

In general, however, we are convinced that the selected sample supports our position, within the obvious limits of such a small data set. If we accept this, then it raises questions about the wider implications of these conclusions. In the first instance, we argue that our position offers a clear explanation for the persistence and popularity of comic-book narratives. In a world where more than half of the population lives in cities,[19] the comic-book superhero offers a cultural device that is capable of negotiating the cognitive gap between human intuitions about the social world and the actual social world that they inhabit. Certainly, this reconciliation can be only temporary; but in such a situation, Sperber argues that "the conceptual mechanism and the symbolic mechanism work in a closed loop and this goes on indefinitely until another perceptual input comes to offer a new object to the conceptual attention and thereby stops the cycle" (*RS*, p. 144).

This, indeed, is precisely what we see in the comic-book literature, which iterates endlessly on what has gone before in a cycle of ceaseless fabulation—a process that, when one considers the rate of production of superhero-themed publications and films, does not seem to be in danger of being arrested by a new object of attention any time soon. In this sense, whatever reservations one may have about such lofty issues as literary merit, comic-book narratives play an important cultural role in reducing the epistemic anxiety attaching to social relations. For this reason if no other, Eco is certainly correct when he reproves the more high-minded critics of comic-book literature "for having exercised an acid moralism on what is innocuous and perhaps even beneficial" ("MS," p. 21).

Moving on to the theoretical side of things, we suggest that our results offer a revised perspective on the project of Darwinian aesthetics. On the surface, it may well seem that our results ratify claims by theorists such as Ellen Dissanayake[18] and Brian Boyd,[20] who argue that art (among other things) plays an important role in cementing social solidarity. However, a closer investigation shows that this is not entirely the case. We argue instead that social solidarity and its attendant problems offer raw material for artistic fabulation to work with—and thus, that art is a specific instance of a more general problem-solving capacity that would have had an obvious survival value in the environment of evolutionary adaptedness.

In this, we follow Sperber and Wilson when they note that "when you hear a parable, or read *War and Peace*, you may gain insight, through some form of analogical thinking, into yourself, your life, and the world as they are."[21] Here, the emphasis falls less on art as the vehicle of solidarity than it does on art as a type of concrete cognition that, in both its production and its reception, is directed at the solution of real-world problems. Indeed, this accords well with Dutton when he claims, "To the ability to think counterfactually, case-based reasoning adds a capacity to interpret and so gain knowledge by drawing analogies and identifying similarities in richly complex situations that are confronted in reality and contemplated in imagination" (*AI*, p. 114). For us, therefore, our survey of the superhero figure suggests that comic-book materials do not engage in a first-order *representation* of social relations, but instead in a second-order *reflection* on the problems that these social relations throw up.

And this brings us, finally, to our concluding remarks. We volunteered our project from the outset as a continuation of Dutton's Darwin-inspired program of cultural analysis. We do not presume to judge for ourselves how effectively we may have succeeded in this, but we remain convinced that the project is worthwhile. Popular culture may lack the structural sophistication of more elevated cultural forms, but what it lacks in sophistication it makes up for in immediacy.[22] Consumers of "high" culture, however disproportionately vocal they may sometimes seem to be, remain a minority audience. In consonance with this, we propose that popular culture may well evince a more direct preoccupation with the evolved intuitions that underwrite aesthetic activity. Indeed, our analysis of the comic-book superhero suggests that stock figures such as the supernatural or quasi-supernatural hero may even have an adaptive value, given his or her universal distribution. Certainly, this is not to

dismiss analyses such as Dutton's, which focus on art in its more refined extensions; it is merely to argue for a complementarity of approach that is sensitive to both varieties of cultural production. It is precisely as a contribution to this undertaking that we offer the present essay.

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