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## HUMAN NATURE IN THE NINETEENTH-CENTURY BRITISH NOVEL: DOING THE MATH

### I

**T**HREE BROAD AMBITIONS ANIMATE this study. Building on research in evolutionary social science, we aimed (1) to construct a model of human nature—of motives, emotions, features of personality, and preferences in marital partners; (2) use that model to analyze some specific body of literary texts and the responses of readers to those texts, and (3) produce data—information that could be quantified and could serve to test specific hypotheses about those texts.

Evolutionary social science is still in the process of constructing a full and adequate model of human nature. Evolutionary social scientists know much already about how human reproductive behavior and human sociality fit into the larger pattern of human evolution. They still have much to learn, though, about the ways literature and the other arts enter into human nature. Our model of human nature draws on our knowledge of imaginative culture, integrates that knowledge with evolutionary theories of culture, and produces data that enable us to draw conclusions on an issue of broad significance for both literary study and evolutionary social science: the adaptive function of literature and the other arts.<sup>1</sup>

In order to make advances in knowledge, it is necessary to choose some particular subject. Genetics is a basic science that applies to all organisms, but geneticists first got an empirical fix on their subject by focusing minutely, with Mendel, on peas, and, with Morgan, on fruit flies. In place of peas and flies, we have taken as our subject British novels of

the longer nineteenth century (Austen to Forster). As a literary topic, the subject is fairly broad, but our theoretical and methodological aims ultimately extend well beyond the specialist fields of British novels, the nineteenth century, British literature, narrative fiction, or even literary scholarship generally. This study is designed to engage the attention of literary scholars in all fields and also to engage the attention of social scientists. If it achieves its aims, this study would help persuade literary scholars that empirical methods offer rich opportunities for the advancement of knowledge about literature, and it would help persuade social scientists that the quantitative study of literature can shed important light on fundamental questions of human psychology and human social interaction. Our own research team combines these two prospective audiences. Two of us (Carroll and Gottschall) have been trained primarily as literary scholars, and two of us (Johnson and Kruger) primarily as social scientists.

The focal point for this study is “agonistic” structure: the organization of characters into protagonists, antagonists, and minor characters. The central question in the study is this: does agonistic structure reflect evolved dispositions for forming cooperative social groups? Suppressing or muting competition within a social group enhances group solidarity and organizes the group psychologically for cooperative endeavor. Our chief hypothesis was that protagonists and good minor characters would form communities of cooperative endeavor and that antagonists would exemplify dominance behavior. If this hypothesis proved correct, the ethos reflected in the agonistic structure of the novels would replicate the egalitarian ethos of hunter-gatherers, who stigmatize and suppress status-seeking in potentially dominant individuals. If suppressing dominance in hunter-gatherers fulfills an adaptive social function, and if agonistic structure in the novels engages the same social dispositions that animate hunter-gatherers, our study would lend support to the hypothesis that literature fulfills an adaptive social function.<sup>2</sup>

One of our chief working hypotheses is that when readers respond to characters in novels, they respond in much the same way, emotionally, as they respond to people in everyday life. They like or dislike them, admire them or despise them, fear them, feel sorry for them, or are amused by them. In writing fabricated accounts of human behavior, novelists select and organize their material for the purpose of generating such responses, and readers willingly cooperate with this purpose. They participate vicariously in the experiences depicted and form personal opinions about the qualities of the characters. Authors and readers

thus collaborate in producing a simulated experience of emotionally responsive evaluative judgment. If agonistic structure is a main shaping feature in the organization of characters in novels, if agonistic structure engages evolved dispositions for forming cooperative social groups, and if novels provide a medium of shared imaginative experience on a large cultural scale, one could reasonably conclude that the novels provide a medium through which authors and readers affirm and reinforce cooperative dispositions on a large cultural scale.<sup>3</sup>

Agonistic structure clearly has a wide conceptual scope in its own right, but analyzing agonistic structure also serves a deeper purpose. By constructing a research design that correlates the features of characters with the responses of readers, we have sought to produce a first approximation to a universal set of categories for analyzing meaning structures in fictional narratives. In this context, "meaning," on one level, signifies the emotional and conceptual significance readers attribute to the organization of characters in the novels. On a second level, "meaning" consists in the psychological functions that organization fulfills. In order to identify those psychological functions, one can make inferences from actual effects. Consider an analogy with physiology. Saliva contains an enzyme that catalyzes the hydrolysis of starch into maltose and dextrin. On the basis of this effect, physiologists can reasonably infer that saliva functions to help digest food. So also, if one observes that agonistic structure has some definite psychological effect, one can formulate reasonable hypotheses about the function this effect fulfills. That function need not be consciously recognized by readers. In *Middlemarch*, speaking of Mrs. Bulstrode and her friend Mrs. Plymdale, George Eliot says that they were "well-meaning women both, knowing very little of their own motives." Like Eliot and like most other novelists, we are assuming that people can be moved powerfully by forces they do not always fully understand.<sup>4</sup>

Taking both attributed significance and psychological function as the referent of the term "meaning," our study presupposes that literary meaning can be reduced to constituent parts, measured, and located precisely within the causal network of nature. In this context, "nature" signifies both the physical world and the bio-cultural world that forms so large a portion of the environment humans create and inhabit. From the evolutionary perspective, culture does not stand apart from the biologically grounded dispositions of human nature. Culture is the medium through which humans organize those dispositions into systems that regulate public behavior and inform private thoughts. In

our understanding, culture translates human nature into social norms and shared imaginative structures.

When they suppose that literary meaning can be objectively, scientifically understood, scholars and scientists adopt a stance that contrasts sharply with the belief, common in the humanities, that literary meaning is illimitably complex and contains irreducible elements of the qualitatively unique. No one study could definitively confirm that all literary meaning can be objectively analyzed, but individual studies can provide strong evidence that major features of meaning can be effectively reduced to simple categories grounded in an evolutionary understanding of human nature. Quantifying literary meaning translates a naturalistic interpretive vision into empirical evidence that literary meaning is determinate, delimited in scope, and consilient with the knowledge of evolutionary biology.

## II

*Collecting the Data and Sorting Characters into Sets.* We created an on-line questionnaire, listed about 2,000 characters from 201 canonical British novels of the nineteenth and early twentieth centuries, and asked respondents to select individual characters and answer questions about each character selected. Potential research participants were identified by scanning lists of faculty in hundreds of English departments worldwide and selecting specialists in nineteenth-century British literature, especially scholars specializing in the novel. Invitations were also sent to multiple listservs dedicated to the discussion of Victorian literature or specific authors or groups of authors in our study. Approximately 519 respondents completed a total of 1,470 protocols on 435 characters. (A copy of the questionnaire used in the study can be accessed at the following URL: <http://www-personal.umich.edu/~kruger/carroll-survey.html>. The form is no longer active and will not be used to collect data.)

The questionnaire contains three sets of categories. One set consists in elements of personal identity: age, attractiveness, motives, the criteria of mate selection, and personality. (The sex of the characters was a given.) A second set of categories consists in readers' subjective responses to characters. Respondents rated characters on ten possible emotional responses and also signified whether they wished the character to succeed in achieving his or her goals. The third set consists in four possible "agonistic" role assignments: (1) protagonists, (2) friends and associates of protagonists, (3) antagonists, and (4) friends and associates

of antagonists. Respondents were free to fill out questionnaires on any individual characters from the list. For each character selected, respondents assigned scores on each category of analysis and also assigned the character to one of the four possible agonistic roles.

Dividing the four agonistic character sets into male and female sets produces a total of eight character sets. The organization of characters into these eight sets forms an implicit empirical hypothesis—the hypothesis that agonistic structure, differentiated by sex, is a fundamental shaping feature in the organization of characters in the novels. We predicted (1) that each of the eight character sets would be sharply defined by a distinct and integrated array of features, that these features would correlate in sharply defined ways with the emotional responses of readers, and that both the features of characters and the emotional responses of readers would correlate, on the average, with character role assignments; (2) that characters identified as protagonists and their friends and associates would have attributed to them, on average, the features to which readers are most attracted and that they most admire; (3) that characters identified as antagonists and their friends and associates would have attributed to them, on average, the characteristics for which readers feel an aversion and of which they disapprove; (4) that protagonists would most completely realize the approbatory tendencies in reader response; and (5) that antagonists would most completely realize the aversive tendencies.

*Averaging Scores.* Comparing scores on characters who were coded by more than one respondent enables us to determine the levels of agreement among the respondents. The levels were quite high, well above the level that is considered acceptable in standard psychological research. When multiple readers did not agree on role assignments, characters are assigned to the role designated by the majority of the respondents. For characters who received multiple codings, scores of all the codings are averaged, so each character is counted only once in the total set of scores that produce averages for the whole data set. For instance, the most popular character, Elizabeth Bennet of Austen's *Pride and Prejudice*, received 81 codings, but those 81 sets of scores are averaged into one score, and that one averaged set of scores counts just the same, in the total data set, as the set of scores for John Dashwood, from Austen's *Sense and Sensibility*, who received only one coding. (Eighty of 81 respondents identified Elizabeth as a protagonist, and the measure of agreement on her scores among all her respondents was very high

indeed. The one dissenting score on role assignment might have been a simple clicking error.)

Psychologists presuppose that when multiple respondents agree about features of people, those features actually exist. The subjects in this study are imagined people rather than actual people, but the principle is the same. Our design presupposes that the features identified by the respondents actually exist in the characters. Correlating emotional responses with attributed features enables us to assess the degree to which emotional responses are constrained by these attributed features. As it happens, there is a high degree of correlation between attributed features and the emotional responses of readers. Now, if the features readers identify in characters actually exist, those features are determined by authors. Authors stipulate a character's sex, age, personality, motives, and criteria for selecting mates. Readers largely agree in recognizing and identifying those features. If readers' emotional responses to characters show a high degree of correlation with attributed features (and they do), one can reasonably infer that authors have a high degree of control in determining readers' emotional responses to characters. Insofar as "meaning" consists in the two levels previously described—the significance readers attribute to the organization of characters, and the psychological functions fulfilled by this organization—one could reasonably conclude that authors have a high degree of control in determining meaning.

*Condensing the Results.* This article offers a condensed version of our findings—comparing only protagonists and antagonists (leaving out minor characters), and displaying the results only for motives, long-term mating, personality, and emotional responses. These results bring out the main tendencies in the data. Since our intended audience includes humanists not familiar with the technical idiom of statistics, the results are summarized in largely discursive form. Readers interested in obtaining more information on the technical statistical details may contact the authors or examine sample chapters from a book manuscript, *Graphing Jane Austen: Human Nature in British Novels of the Longer Nineteenth Century* (under review) that provides extensive statistical documentation. (For authors' contact information and sample chapters, see <http://www.umsl.edu/~carrolljc/>.)

Section three below contains explanations of the categories used to analyze character attributes and readers' responses. The explanations are followed by brief descriptions of the main results. Section four

contains the chief conclusions drawn from the findings delineated in section three.

### III

*Motives.* Motives are basic life goals. They are the chief organizing principle in human behavior. The categories for motives take account of the features of human life history that have been preserved from our mammalian and primate lineage; the specifically human reproductive characteristics that involve long-term pair-bonding, differing male-female mate-selection strategies, paternal investment, and the existence of extended kin networks; evolved human dispositions for forming coalitions, dominance hierarchies, and in-groups and out-groups; and the peculiarly human dispositions for acquiring and producing culture. Analyzing these topics produced a list of twelve basic motives: (1) Survival (fending off imminent physical danger or privation); (2) Finding a short-term romantic partner; (3) Finding or keeping a spouse; (4) Gaining or keeping wealth; (5) Gaining or keeping power; (6) Gaining or keeping prestige; (7) Obtaining education or culture; (8) Making friends and forming alliances; (9) Nurturing/fostering offspring or aiding other kin; (10) Aiding non-kin; (11) Building, creating, or discovering something; and (12) Performing routine tasks to gain a livelihood.<sup>5</sup>

We predicted (1) that protagonists would be generally affiliative in their motives—concerned with helping kin and making friends; (2) that antagonists would be chiefly concerned with acquiring wealth, power, and prestige; and (3) that protagonists would on average be much more concerned than antagonists or minor characters with acquiring education and cultural knowledge.

To bring the motives into a compact form, we conducted a statistical procedure known as “factor analysis.” This procedure analyzes the elements that correlate with one another either negatively or positively. Any such cluster of correlated elements is called a “factor.” For instance, in this data set, wealth, power, and prestige are very highly correlated with one another, and they are negatively correlated with helping non-kin. In other words, characters who scored high on seeking wealth also tended to score high on seeking power and prestige. Those same characters also tended to score low on helping non-kin. Seeking wealth thus has a positive correlation with seeking prestige and power and a negative correlation with helping non-kin. These clustered correlations form a

factor that is here designated “Social Dominance.” Social Dominance strongly distinguishes characters assigned to roles as antagonists.

In addition to Social Dominance, factor analysis produced four distinct motive factors: Constructive Effort, Romance, Nurture, and Subsistence. Constructive Effort most strongly characterizes protagonists, both male and female. It consists of two pro-social elements (helping non-kin and making friends) and two cultural elements (seeking education and building or creating something). The other three motive factors are distributed among male and female protagonists. Male protagonists are motivated by Subsistence, that is, by survival and by doing routine work to earn a living. Female protagonists are motivated by Romance (mating efforts) and by Nurture (caring for offspring and other kin). The distribution of these last three factors corresponds to the distribution of social roles in the period. Males were obligated to provide an income, and for most females “career” options were limited to marriage and family. Males were also more likely to encounter physical danger.

Figure 1 displays scores on motive factors for male and female protagonists and antagonists. The scores are displayed in standardized form, in units of standard deviation. The horizontal line at the zero point is the average score for all the characters on any given factor. Bars rising above the horizontal midline indicate scores above the average,

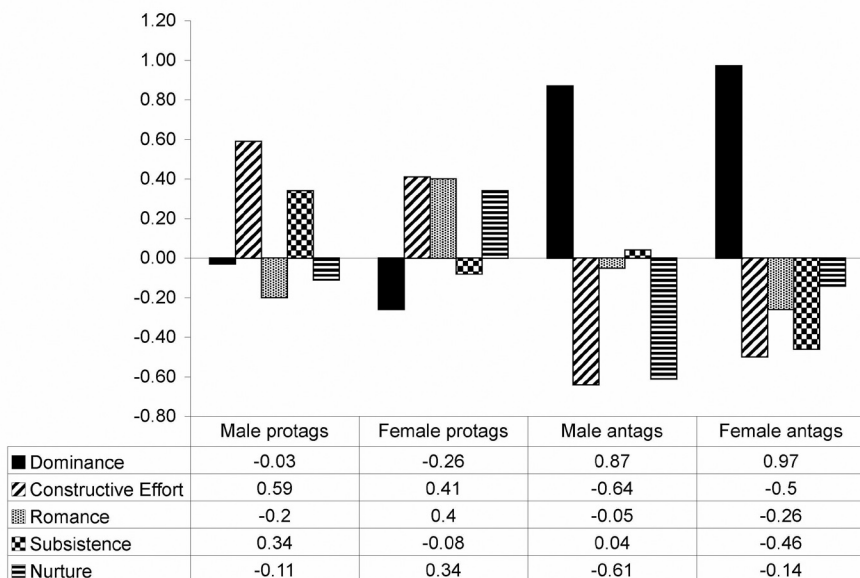


Figure 1. Motive factors in protagonists and antagonists.

and scores falling below the midline indicate scores below the average. A score of 1 would constitute a score one standard deviation higher than the average. A score of  $-1$  would constitute a score one standard deviation lower than the average. For instance, female antagonists score .97 on Social Dominance (just .03 short of a single standard deviation above the average), and they score  $-.5$  on Constructive Effort—exactly half a standard deviation below the average. (The same system is used in the other scores displayed below.)

A standard deviation is the average distance from the mean. Units of standard deviation correlate with percentiles. For instance, on any given factor, for either a character set or an individual character, if a score is one standard deviation above the average, that score is higher than about 84% of all other scores on that factor. Half a standard deviation (.5) is higher than about 69% of all other scores. One and a half standard deviations (1.5) is higher than all but about 93% of all other scores. For negative scores (below average rather than above average), the percentiles are the same, with the direction reversed. For instance, a score of one standard deviation below average is lower than about 84% of all other scores.

To give just two quick examples of individual characters, Dorothea Brooke in George Eliot's *Middlemarch* is an exemplary female protagonist. She scores low on Dominance ( $-.9$ ), very high on Constructive Effort (1.39), somewhat above average on Romance (.19), and fairly high on Nurture (.52). Mrs. Norris, in contrast, an antagonist from Austen's *Mansfield Park*, scores very high on Dominance (1.46) and low on Constructive Effort ( $-.76$ ).

*Criteria for Selecting Mates in the Long Term (Marital Partners)*. Studies in evolutionary psychology have identified general differences between the mating preferences of males and females. Males and females both are predicted to value intrinsic qualities such as kindness, intelligence, and reliability in mates, but males are predicted preferentially to value physical attractiveness in a mate, and females preferentially to value extrinsic attributes (wealth, prestige, and power) in a mate. These contrasting preferences are rooted in the logic of reproduction. Physical attractiveness in females serves as a proxy for youth and health in a woman—hence for reproductive potential—and extrinsic attributes enable a male to provide for a mate and her offspring. The seven terms just listed thus include criteria in which male and female preferences are expected to overlap and also criteria in which they are expected to differ.<sup>6</sup>

As in analyzing motives, statistical procedures compressed the crite-

ria for selecting mates into clusters or “factors,” that is categories that contain closely correlated elements. There are three clearly defined mate selection factors: a preference for (1) Intrinsic Qualities (reliability, kindness, intelligence); (2) Extrinsic Attributes (wealth, power, prestige); and (3) Physical Attractiveness (by itself).

Figure 2 displays the scores on mate selection. Male protagonists display a strongly marked preference for Physical Attractiveness in a mate. Female protagonists display a moderate preference for Extrinsic Attributes and a strong preference for Intrinsic Qualities. Female antagonists display a pronounced and exclusive preference for Extrinsic Attributes. Male antagonists score at or below average on all preferences. Both male and female antagonists score very far below average in preferences for Intrinsic Qualities.

Elizabeth Bennet from Austen’s *Pride and Prejudice* offers an exemplary instance of criteria for selecting mates in female protagonists. She scores moderately high on seeking Extrinsic Attributes in a mate (.32), very high on seeking Intrinsic Qualities (1.15), and just about average on seeking Physical Attractiveness (−.03). In contrast to Elizabeth, Augusta Elton, an antagonist from Austen’s *Emma*, scores very high on seeking Extrinsic Attributes (1.45) and very low on seeking Intrinsic Qualities

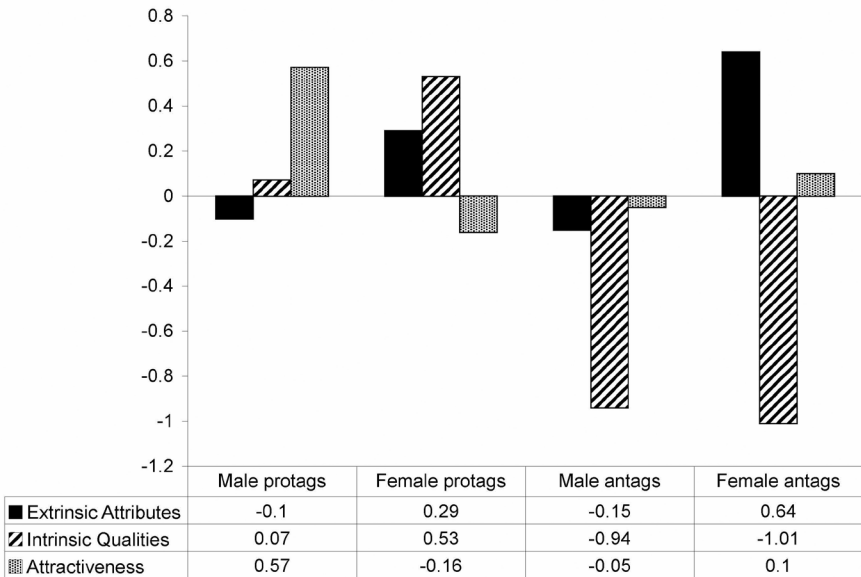


Figure 2: Criteria for Selecting Long-Term Mates in Protagonists and Antagonists.

(-1.15). Elizabeth's eventual marital choice, Fitzwilliam Darcy, deviates somewhat from the average male protagonist. He scores fairly high on seeking Physical Attractiveness (.59) but also high on seeking Extrinsic Attributes (.60) and exceptionally high, for a male, on seeking Intrinsic Qualities (.81).

If a protagonist or antagonist deviates from the average, that deviation enters deeply into the imaginative qualities that distinguish one novel from another. If a pattern of such deviations emerges across an author's whole body of work (as is the case with Austen's protagonistic males), those deviations can help us to define the imaginative qualities that distinguish that author from other authors.

*Personality Factors.* The standard model for personality now is the five-factor or "big five" model. *Extraversion* signals assertive, exuberant activity in the social world versus a tendency to be quiet, withdrawn and disengaged. *Agreeableness* signals a pleasant, friendly disposition and tendency to cooperate and compromise, versus a tendency to be self-centered and inconsiderate. *Conscientiousness* refers to an inclination toward purposeful planning, organization, persistence, and reliability, versus impulsivity, aimlessness, laziness, and undependability. *Emotional Stability* reflects a temperament that is calm and relatively free from negative feelings, versus a temperament marked by extreme emotional reactivity and persistent anxiety, anger, or depression. *Openness to Experience* describes a dimension of personality that distinguishes open (imaginative, intellectual, creative, complex) people from *closed* (down-to-earth, uncouth, conventional, simple) people.<sup>7</sup>

We predicted that (1) protagonists and their friends would on average score higher on the personality factor Agreeableness, a measure of warmth and affiliation; and (2) that protagonists would score higher than antagonists on Openness to Experience, a measure of intellectual vivacity.

Figure 3 displays the scores on personality. Male and female protagonists are both somewhat introverted, agreeable, conscientious, emotionally stable, and open to experience. Female protagonists score higher than any other set on Agreeableness, Conscientiousness, and Openness, and they score in the positive range on Stability. In personality, male protagonists look like slightly muted or moderated versions of female protagonists. Male and female antagonists are both relatively extraverted, highly disagreeable, and low in Stability and Openness. On each of the five factors, the protagonists and antagonists pair off and stand in contrast to one another.

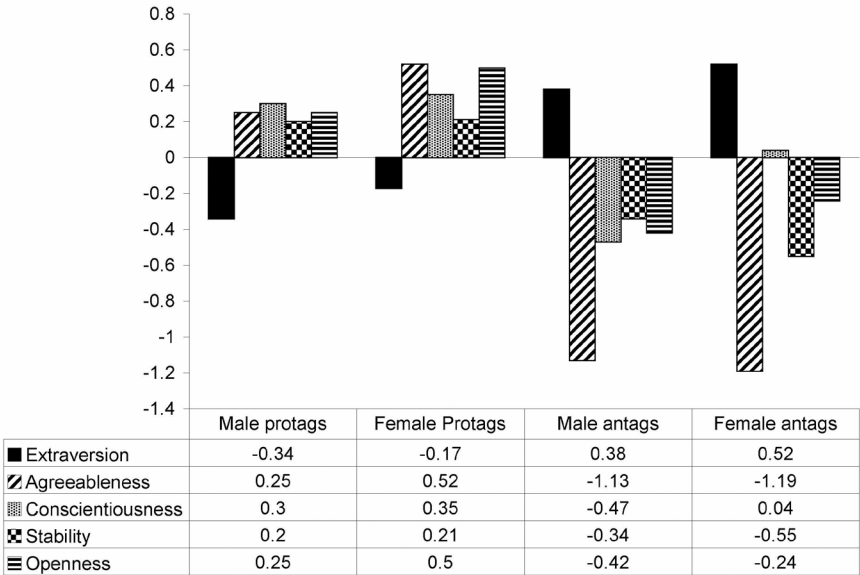


Figure 3: Personality factors in protagonists and antagonists.

Charlotte Brontë’s *Jane Eyre* has a personality that is unequivocally protagonistic but that also has a distinctive cast common to Charlotte Brontë’s protagonists and to those of her sister Anne: very low on Extraversion (-1.14), well above average on Agreeableness (.47) and Emotional Stability (.38), and high on Conscientiousness (.98) and Openness to Experience (.81). Bertha Rochester, in contrast, the madwoman in *Jane Eyre*, has a personality that is unequivocally antagonistic and that also reflects the character of her insanity: low on Agreeableness (-.80) and Openness to Experience (-.46), and ultra-low on Conscientiousness (-1.46) and Emotional Stability (-1.61).

*Emotional Responses.* As noted above, scores on emotional responses do not signify the emotions *in* the characters but rather the emotional responses readers had *to* the characters. Our aim was to identify emotions that are universal and that are thus likely to be grounded in universal, evolved features of human psychology. The solution was to use Paul Ekman’s influential set of seven basic or universal emotions: anger, fear, disgust, contempt, sadness, joy, and surprise. These terms were adapted for the purpose of registering graded responses specifically to persons or characters. Four of the seven terms were used unaltered: anger, disgust, contempt, and sadness. Fear was divided into two distinct items: fear *of*

a character, and fear *for* a character. “Joy” or “enjoyment” was adapted both to make it idiomatically appropriate as a response to a person and also to have it register some distinct qualitative differences. Two terms, “liking” and “admiration,” served these purposes. “Surprise,” like “joy,” seems more appropriate as a descriptor for a response to a situation than as a descriptor for a response to a person or character. Consequently, in place of the word “surprise,” we used the word “amusement,” which combines the idea of surprise with an idea of positive emotion. One further term was included in the list of possible emotional responses: indifference. Indifference is the flip side of “interest,” the otherwise undifferentiated sense that something matters, that it is important and worthy of attention.<sup>8</sup>

We predicted (1) that protagonists would receive high scores on the positive emotional responses “liking” and “admiration”; (2) that antagonists would receive high scores on the negative emotions “anger,” “disgust,” “contempt,” and “fear-of” the character; (3) that protagonists would score higher on “sadness” and “fear-for” the character than antagonists; and (4) that major characters (protagonists and antagonists) would score lower on “indifference” than minor characters.

As in motives and mate selection, statistical procedures compressed the elements of emotional response into a smaller number of “factors.” There were three clearly defined emotional response factors: (1) Dislike, which includes anger, disgust, contempt, and fear *of* the character, and which also includes negative correlations with admiration and liking; (2) Sorrow, which includes sadness and fear *for* the character and a negative correlation with amusement; and (3) Interest, which consists chiefly in a negative correlation with indifference.

Figure 4 displays the scores on emotional responses. The antagonists score very high on Dislike, low on Sorrow, and somewhat above average on Interest. Male and female protagonists both score low on Dislike and high on Sorrow. Female protagonists score high on Interest, but male protagonists, contrary to our expectations, score below average on Interest.

Count Dracula, from Stoker’s *Dracula*, offers an unmistakably antagonistic profile: a very high score on Dislike (1.06), a respectable score on Interest (.33), and—despite having his head lopped off with a bowie knife—an only average score on Sorrow (−.06). In contrast, Anne Elliott, the protagonist of Austen’s *Persuasion*, scores low on Dislike (−.76), high on Interest (.59). and moderately high on Sorrow (.40).

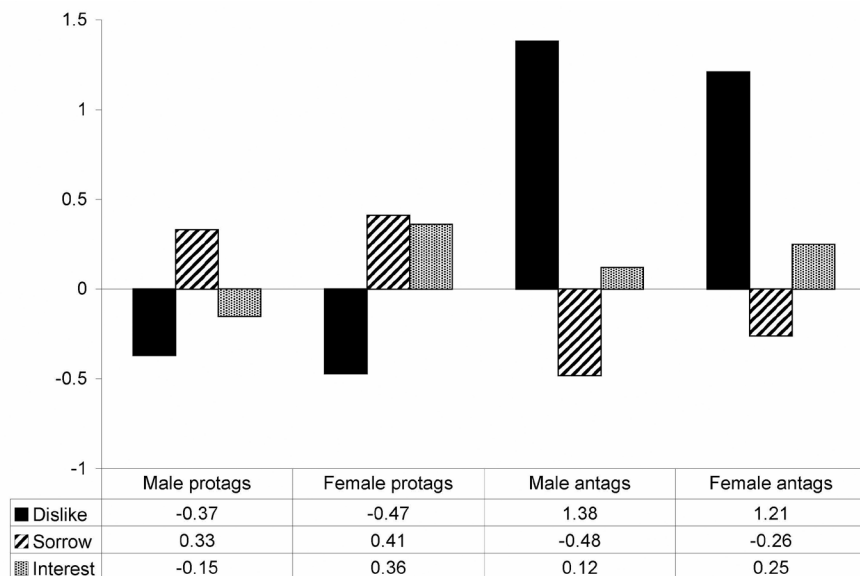


Figure 4: Emotional responses to protagonists and antagonists.

#### IV

The data from the questionnaire could have either confirmed or falsified the existence of agonistic structure. If the character sets had been indistinct, if they had displayed no particular patterns, if the content of character had not correlated with the emotional responses of readers, or if the responses of readers had not correlated with agonistic role assignments, the hypotheses built into the research design would have been falsified. As it turned out, the hypotheses were robustly confirmed. The character sets are sharply defined and contrasted through a correlated suite of characteristics: motives, mate-selection, personality, age, and attractiveness. And that suite of characteristics correlates strongly with the emotional responses of readers. The use of an evolutionary model of human nature gives us the basis for a quantitative delineation of agonistic structure, and the clear delineation of agonistic structure in turn supports the analytic utility of an evolutionary model of human nature.

Agonistic structure in these novels displays a systematic contrast between desirable and undesirable traits in characters. Protagonists exemplify traits that evoke admiration and liking in readers, and antagonists exemplify traits that evoke anger, fear, contempt, and disgust.

Antagonists virtually personify Social Dominance—the self-interested pursuit of wealth, prestige, and power. In these novels, those ambitions are sharply segregated from prosocial and culturally acquisitive dispositions. Antagonists are not only selfish and unfriendly but also undisciplined, emotionally unstable, and intellectually dull. Protagonists, in contrast, display motive dispositions and personality traits that exemplify strong personal development and healthy social adjustment. Protagonists are agreeable, conscientious, emotionally stable, and open to experience. Protagonists clearly represent the apex of the positive values implicit in agonistic structure. Both male and female protagonists score high on the motive factor Constructive Effort, a factor that combines prosocial and culturally acquisitive dispositions. Their introversion, in this context, seems part of their mildness. The extraversion of antagonists, in contrast, seen in the context of their scores on other personality factors and on motives, seems to indicate aggressive self-assertion.

There are of course exceptions to the large-scale patterns that prevail in the data—a small but distinct class of agonistically ambiguous characters such as Becky Sharp in Thackeray's *Vanity Fair*, Catherine and Heathcliff in Emily Brontë's *Wuthering Heights*, the Monster in Shelley's *Frankenstein*, Lucy Graham in Braddon's *Lady Audley's Secret*, and Dorian Gray in Wilde's *The Picture of Dorian Gray*. Such characters tend to score low on Agreeableness but also high on Openness to Experience, high on Dislike but also high on Sorrow. Such exceptions are extremely interesting but do not subvert the larger pattern. The larger pattern stands out clearly *despite* the blurring produced by the exceptions. An analogy might clarify this issue. When social scientists select a population of humans and score them on sexual orientation, a small percentage of their subjects have scores that are sexually ambiguous or that reverse heterosexual dispositions. The average scores for the total population nonetheless display clear patterns of heterosexual polarization—men preferring women, and women preferring men. Once one begins thinking statistically, there is less temptation to give undue prominence to special cases and exceptions. Analysis is instead in terms of population averages. Within those population averages, good analytic sense can be made of the special cases and exceptions.

At the level of discrete observations from within the common language, some of our specific findings might seem fairly obvious. It might not, for instance, seem terribly surprising that readers dislike antagonists or that readers feel more sorrow, on average, for protagonists than for antagonists. Taken collectively, such findings nevertheless advance our

knowledge in three distinct ways. Each finding serves as evidence for a large-scale hypothesis about the existence of agonistic structure; each forms part of a network of theoretically rationalized categories about human nature and literature; and each contributes to a total set of relations from which one can draw inferences not readily available to common observation.

Most people would acknowledge, in a casual way, that “readers dislike antagonists.” But casual acknowledgments do not go very far toward providing empirical support for the proposition that novels are organized into systematic patterns of opposition between protagonists and antagonists. Topics of this sort are highly speculative; they admit of much ambiguity in definition; and appeals to specific cases, taken singly, could be manipulated in such a way as to support virtually any thesis on the subject. By producing data from many novels in which the word “dislike” correlates with specific attributes of characters, one limits the range of speculation and brings the subject within the scope of empirical knowledge.

In our view, observation at the level of discrete and fragmentary impression is less valuable, as knowledge, than observation lodged within theoretically rationalized categories. The word “dislike” is a common language term, but in our usage, it is also the product of a statistical analysis of ten emotional responses derived from the systematic empirical study of universal human emotions. Similar considerations apply to the other categories used to delineate character sets. The personality factor “Agreeableness” is a common language term, but it is also part of a model, derived from the statistical analysis of thousands of lexical items, that organizes personality into five superordinate factors. The motives and criteria of mate selection used in the questionnaire are couched in the common language, but they are also part of an integrated set of principles lodged within the explanatory context of evolutionary social science. Dislike correlates negatively with Agreeableness, positively with Social Dominance, and negatively with a preference for Intrinsic Qualities in a mate. Such correlations provide evidence for the existence of agonistic structure; the clear patterns of agonistic structure testify to the robust quality of the categories; and evolutionary social science provides a larger explanatory context both for the categories and for agonistic structure.

If one presupposes that agonistic structure exists, this or that finding in our study, taken singly, might not seem surprising, but for many readers in the humanities, the central premise of this study will probably be not

only surprising but deeply disturbing. Our central premise is that both human nature and literary meaning can be circumscribed, reduced to finite elements, and quantified. We reduced human nature to a set of categories and used those categories to trace out quantitative relationships in responses to a large body of literary texts. This procedure tacitly negates the idea—nebulous and pervasive, Protean in its varieties—that literature and the experience of literature occupy a phenomenological realm that is separate and qualitatively distinct from the realm that can be understood by science.<sup>9</sup>

We made a number of detailed predictions about the relation between categories and character sets, and most of these predictions were confirmed, but some of our findings have been surprising to us, and all of our findings collectively have enabled us to draw inferences we could not have formulated before analyzing the data derived from the model of agonistic structure. Two findings seem to have an especially broad import for the organization of meaning and value in the novels: a bias for female-centered values, and the subordination of differences between males and females to differences between protagonists and antagonists.

In the world of these novels, males hold positions of political, institutional, and sometimes of economic power denied to females, but females hold a kind of psychological and moral power that is exemplified in their status as paradigmatic protagonists. The most important distinguishing features of antagonists, both male and female, are high scores on the motive factor Social Dominance (the desire for wealth, power, and prestige), low scores on the personality factor Agreeableness, and low scores on a preference for Intrinsic Qualities (intelligence, kindness, and reliability) in a mate. Female protagonists score lowest of any character set on Dominance and highest on Agreeableness and on preferring Intrinsic Qualities in mates. They also score highest in the typically protagonistic personality factors Conscientiousness, Emotional Stability, and Openness. In these important ways, female protagonists hold a central position within the normative value structure of the novels. The ethos of the novels is in this sense feminized or gynocentric.

Once one has isolated the components of agonistic structure and deployed a model of reading that includes basic emotions as a register of evaluatively polarized response, most of the scores on emotional response factors are predictable. There is, however, one surprising and seemingly anomalous finding that emerges from the scores on emotional responses—the relatively low score received by male pro-

tagonists on Interest. This finding ran contrary to our expectation that protagonists, both male and female, would score lower on indifference than any other character set. This finding can be explained by the way agonistic polarization feeds into the psychology of cooperation. Male protagonists in our data set are relatively moderate, mild characters. They are introverted and agreeable, and they do not seek to dominate others socially. They are pleasant and conscientious, and they are also curious and alert. They are attractive characters, but they are not very assertive or aggressive characters. They excite very little Dislike at least in part because they do not excite much sense of competitive antagonism. They are not intent on acquiring wealth and power, and they are thoroughly domesticated within the forms of conventional propriety. They serve admirably to exemplify normative values of cooperative behavior, but in serving this function they seem to be diminished in some vital component of fascination, some element of charisma. They lack power, and in lacking power, they seem also to lack some quality that excites intensity of interest in emotional response.

We did not anticipate either that male protagonists would be so strongly preoccupied with Physical Attractiveness relative to other qualities or that male antagonists would be so relatively indifferent to Physical Attractiveness. The inference we draw from these findings is that the male desire for physical beauty in mates is part of the normative value structure of the novels. Male antagonists' relative indifference to Physical Attractiveness seems part of their general indifference to interpersonal relations.

If one were to look only at the motive factors, one might speculate that male antagonists correspond more closely to their gender norms than female antagonists do. Male antagonists could be conceived as personified reductions to male dominance striving. The relative indifference male antagonists feel toward any differentiating features in mates might, correspondingly, look like an exaggeration of the male tendency toward interpersonal insensitivity. Conceived in this way, male antagonists would appear to be ultra-male, and female antagonists, in contrast, would seem to cross a gender divide. Their reduction to dominance striving would be symptomatic of a certain masculinization of motive and temperament. They would be, in an important sense, de-sexed. Plausible as this line of interpretation might seem, it will not bear up under the weight of the evidence about male antagonists' relative indifference to Physical Attractiveness in a mate. Like female antagonistic dominance striving, that also is a form of de-sexing. Dominance striving devoid of

all affiliative disposition constitutes a reduction to a core element of sex-neutral egoism. The essential character of male and female antagonists is thus not a sex or gender-specific tendency toward masculinization; it is a tendency toward sexual neutralization in the general isolation of an ego disconnected from all social bonds.

In the past thirty years or so, more criticism on the novel has been devoted to the issue of gender identity than to any other topic. The data in our study indicate that gender can be invested with a significance out of proportion to its true place in the structure of interpersonal relations in the novels and that it can be conceived in agonistically polarized ways out of keeping with the forms of social affiliation depicted in the novels. In this data set, differences between males and females are less prominent than differences between protagonists and antagonists. If polarized emotional responses were absent from the novels, or if those polarized responses co-varied with differences between males and females, the differences between male and female characters might be conceived agonistically—as a conflict. The differences between male and female characters in motives and personality could be conceived as competing value structures. From a Marxist perspective, that competition would be interpreted as essentially political and economic in character, and from the deeper Darwinian perspective, it would ultimately be attributed to competing reproductive interests. The subordination of sex to agonistic role assignment, though, suggests that in these novels conflict between the sexes is subordinated to their shared and complementary interests. In the agonistic structure of plot and theme, male and female protagonists are allies. They cooperate in resisting the predatory threats of antagonists, and they join together to exemplify the values that elicit the readers' admiration and sympathy. Both male and female antagonists are massively preoccupied with material gain and social rank. That preoccupation stands in stark contrast to the more balanced and developed world of the protagonists—a world that includes sexual interest, romance, the care of family, friends, and the life of the mind. By isolating and stigmatizing dominance behavior, the novels affirm the shared values that bind its members into a community.

Is it feasible to reason backwards from our findings to formulate hypotheses about functions fictional narratives might have fulfilled in ancestral environments? By identifying one of the ways novels actually work for us now, can one produce evidence relevant to hypotheses about the evolutionary origin and adaptive function of the arts? Yes. Agonistic structure is a central principle in the organization of characters in the

novels. Taking into account not just the representation of characters but the emotional responses of readers, one can identify agonistic structure as a simulated experience of emotionally responsive social interaction, and that experience has a clearly defined moral dimension. Agonistic structure precisely mirrors the kind of egalitarian social dynamic documented by Boehm in hunter-gatherers—our closest contemporary proxy to ancestral humans. As Boehm and others have argued, the dispositions that produce an egalitarian social dynamic are deeply embedded in the evolved and adapted character of human nature. An egalitarian social dynamic is the most important basic structural feature that distinguishes human social organization from the social organization of chimpanzees. In chimpanzee society, social organization is regulated exclusively by dominance. In human society, social organization is regulated by interactions between impulses of dominance and impulses for suppressing dominance. State societies with elaborate systems of hierarchy emerged only very recently in the evolutionary past, about ten thousand years ago, after the agricultural revolution made possible concentrations of resources and therefore power. Before the advent of despotism, the egalitarian disposition for suppressing dominance had, at a minimum, a hundred thousand years in which to become entrenched in human nature. In highly stratified societies, dominance assumes a new ascendancy, but no human society dispenses with the need for communitarian association. It seems likely, then, that agonistic structure in fictional narratives emerged in tandem with specifically human adaptations for cooperation and specifically human adaptations for creating imaginative constructs that embody the ethos of the tribe.<sup>10</sup>

Agonistic structure in these novels seems to serve as a medium for readers to participate vicariously in an egalitarian social ethos. If that is the case, the novels can be described as prosthetic extensions of social interactions that in non-literate cultures require face-to-face interaction. If that face-to-face interaction fulfils an adaptive function, and if agonistic structure is a cultural technology that fulfils the same adaptive function, one could reasonably conclude that agonistic structure fulfils an adaptive function. We hope to see further empirical research that opens up new ways of probing this important issue.

We have suggested that the novels provide a medium of shared imaginative experience through which authors and readers affirm and reinforce egalitarian dispositions on a large cultural scale. At least one possible challenge to this hypothesis could readily be anticipated. Could it not plausibly be argued that the novels merely depict social dynamics

as they actually occur in the real world? If that were the case, one would have no reason to suppose that that the novels mediate psychological processes in the community of readers. The novels might merely serve readers' need to gain realistic information about the larger patterns of social life. To assess the cogency of this challenge, consider the large-scale patterns revealed in our data and ask whether those patterns plausibly reflect social reality:

The world is in reality divided into two main kinds of people. One kind is motivated exclusively by the desire for wealth, power, and prestige. These people have no affiliative dispositions whatsoever. Moreover, they are old, ugly, emotionally unstable, undisciplined, and narrow minded. The second kind of people, in contrast, have almost no desire for wealth, power, and prestige. They are animated by the purest and most self-forgetful dispositions for nurturing kin and helping non-kin. Moreover, they are young, attractive, emotionally stable, conscientious, and open-minded. Life consists in a series of clear-cut confrontations between these two kinds of people. Fortunately, the second set almost always wins, and lives happily ever after. This is reality, and novels do nothing except depict this reality in a true and faithful way.

In our view, this alternative hypothesis fails of conviction. The novels contain a vast fund of realistic social depiction and profound psychological analysis. In their larger imaginative structures, though, the novels evidently do not just represent human nature; they embody the impulses of human nature. Those impulses include a need to derogate dominance in others and to affirm one's identity as a member of a social group. Our evidence strongly suggests that those needs provide the emotional and imaginative force that shapes agonistic structure in the novels.

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