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The Changing Psychology of Culture From 1800 Through 2000

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Abstract

The Google Books Ngram Viewer allows researchers to quantify culture across centuries by searching millions of books. This tool was used to test theory-based predictions about implications of an urbanizing population for the psychology of culture. Adaptation to rural environments prioritizes social obligation and duty, giving to other people, social belonging, religion in everyday life, authority relations, and physical activity. Adaptation to urban environments requires more individualistic and materialistic values; such adaptation prioritizes choice, personal possessions, and child-centered socialization in order to foster the development of psychological mindedness and the unique self. The Google Ngram Viewer generated relative frequencies of words indexing these values from the years 1800 to 2000 in American English books. As urban populations increased and rural populations declined, word frequencies moved in the predicted directions. Books published in the United Kingdom replicated this pattern. The analysis established long-term relationships between ecological change and cultural change, as predicted by the theory of social change and human development (Greenfield, 2009).

Keywords

sociocultural factors, values, cultural change, content analysis, quantitative analysis

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In this study, I used the Google Books Ngram Viewer[1] (Michel et al., 2011) to explore theory-driven hypotheses linking ecological and cultural change. This tool from the digital humanities allowed me to test an interdisciplinary theory integrating psychology with sociology and anthropology. The Google Books Ngram Viewer is a new tool for the quantitative analysis of long-term culture change. The hypotheses were generated from my theory of social change and human development (Greenfield, 2009). A central theoretical claim is that different value systems, behaviors, and human psychologies are adapted to different types of ecology. The ecological level of the theory is based on the ideal types of *gemeinschaft* (community) and *gesellschaft* (society) developed by the German sociologist Tönnies in the 1800s (1887/1957). A key characteristic of gemeinschaft environments is that they are rural; other interrelated characteristics are subsistence economies, simple technology, and low levels of wealth (cf. Inglehart & Baker, 2000). Education takes place at home around practical skills. A key characteristic of gesellschaft environments is that they are urban; other interrelated characteristics are commercial economies, complex technology, and high levels of wealth. Education centers on school and the development of the mind. These characteristics of the ideal types anchor quantitative dimensions in the theory of social change and human development.

Cultural Values, Behaviors, and Psychology Are Adapted to Different Ecologies

According to this theory, individualistic values, behavior, and psychology (centered on the independent and unique individual) are adapted to gesellschaft environments, whereas collectivistic values, behavior, and psychology (centered on the interdependent family or community)

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are adapted to gemeinschaft conditions (Greenfield, 2009). Whereas obligation, duty, contributing to the welfare of other people, religion, and respect for authority are adaptive values in a gemeinschaft environment, personal choice, accumulation of personal property, materialism, and child centeredness are adaptive values in a gesellschaft environment (Fuligni & Zhang, 2004; Inglehart & Baker, 2000; Manago & Greenfield, 2011; Ochs & Schieffelin, 1984; Piff, Kraus, Côté, Cheng, & Keltner, 2010; Raeff, Greenfield, & Quiroz, 2000; Varnum, Grossmann, Kitayama, & Nisbett, 2010).

In the psychological-behavioral domain, people are focused on overt action in gemeinschaft environments (e.g., Childs & Greenfield, 1980); they are more attuned to inner psychological processes in gesellschaft environments (Demuth, Keller, & Yovsi, 2012; Greenfield & Bruner, 1966; Kraus, Pif, Mendoza-Denton, Rheinschmidt, & Keltner, 2012). In gesellschaft environments, the emphasis is on the experience of the individual; thus intraindividual phenomena such as personal perspectives, desires, and feelings—all characteristics of the self—are important (Inglehart & Baker, 2000; Kraus et al., 2012; Manago, 2012). In gemeinschaft environments, in contrast, the emphasis is on the group; thus, what is significant are outward behaviors that can be observed and reacted to by other people.

Gesellschafts are complex environments with more gemeinschaft environments nested within the larger society. Thus, within a gesellschaft environment, members of lower socioeconomic status (SES) and residents of rural areas live in relatively more gemeinschaft conditions than members of higher SES and residents of urban areas (Greenfield, 2009); cultural values reflect both the society as a whole and individual differences within that society (Na et al., 2010). Therefore, as the theory predicts, participants of lower SES are more generous, charitable, and interdependent than individuals of higher SES. In contrast, individuals of higher SES focus more on their own internal states, goals, motivations, and emotions (Kraus et al., 2012). Religious values are more important in rural than in urban environments (Chalfant & Heller, 1991).

Ecological Change Drives Shifts in Values, Behaviors, and Psychology

An essential theoretical point is that classical concepts of individualism/independence and collectivism/interdependence (Greenfield & Bruner, 1966; Hofstede, 1980; Markus & Kitayama, 1991; Triandis, 1989) are adapted to ecological conditions and therefore influenced by these conditions. As a consequence, the theory predicts that ecological change will modify values, behaviors, and psychology. When any ecological dimension moves in the gesellschaft direction—for example, urbanization, increased wealth, technological development, or greater availability of formal education—values, behaviors, and psychology become more individualistic and materialistic (Greenfield, 2009; Uhls & Greenfield, 2011): The various ecological factors are seen as equipotential.

Although the factors are equipotential, they are not independent. The use of gemeinschaft and gesellschaft as paradigms represents the patterning of ecological variables to make a complete environment. In this respect, the theory of social change and human development differs from the dominant paradigm in psychology, which seeks to "disentangle" variables. In contrast, the viewpoint here is that ecological factors operate synergistically and interactively, not in isolation. In the present study, urbanization was used as a stand-in for the whole complex of gesellschaft factors.

Unlike outdated modernization theories (e.g., Lerner, 1958), ecological change is potentially bidirectional (Inglehart & Baker, 2000; Park, Twenge, & Greenfield, 2013). Nonetheless, global change on the whole is decidedly in the gesellschaft direction; developing countries have become wealthier, more urbanized, more technologically advanced, and more highly educated. But the process also applies to countries such as the United States and the United Kingdom, which have, on a different time course, also become increasingly wealthy, urbanized, technologically advanced, and highly educated (e.g., Inglehart & Baker, 2000; Monkkonen, 1988; National Committee of Inquiry Into Higher Education, 1997; Uhls & Greenfield, 2011; World Bank, 2012). The trend is particularly noticeable if one views the situation over a timescale of centuries, as in the present study.

The goal of the study was to demonstrate that, as the United States moved ever further in the gesellschaft direction, gesellschaft-adapted cultural features, as indexed by relevant words in the corpus of millions of American books analyzed by the Google Ngram Viewer, showed a quantitative increase, whereas gemeinschaft-adapted cultural features, indexed by relevant words in the same corpus, showed a quantitative decrease. In order to make this case, I compiled data about the pattern of ecological change from the years 1800 to 2000, as well as patterns of word-frequency change from 1800 to 2000 in the United States. Replication with books published in the United Kingdom during this same period provided cross-national generalizability.

Up to now, empirical evidence supporting the theory of social change and human development has generally been on the scale of decades (Flynn, 1984; Greenfield, 1998, 2009; Greenfield, Maynard, & Childs, 2003; Inglehart & Baker, 2000; Twenge, Campbell, & Gentile, 2012, 2013; Uhls & Greenfield, 2011). None of these studies covered the two-century time span of the Google Books Ngram Viewer; many are small in scope as well as time span. Yet key ecological changes occur over a very large scale of time and affect masses of people. The Google Books

Ngram Viewer provides the first quantitative tool to assess the impact on cultural meanings of social change over centuries of time utilizing a very broad base of cultural knowledge and communication.

Method

The Google Ngram Viewer is a tool for massive culturewide content analysis. Content analysis is a method for analyzing the construction of implicit meaning in the communication process (Krippendorf, 2004). Content analysis of cultural products has been of great value in cultural psychology, in which this method has, for example, been used to distinguish implicit cultural models of the ideal person through cross-cultural comparison of magazine ads (Kim & Markus, 1999). Computerized content analysis has a venerable history in psychology, with the first system being introduced for clinical psychology, social psychology, and cross-cultural studies in 1966 (Stone, Dunphy, & Smith, 1966). However, the Google Ngram Viewer allows massive, culturewide data analysis over centuries, something that has not heretofore been possible.

Corpus of books

The main Google corpus used in the present study consists of about 1,160,000 English-language books published between the years 1800 and 2000 in the United States. A second corpus of about 350,000 books published in the United Kingdom in this same time period served as a replication sample (Michel et al., 2011, Supplementary Online Material). The Google team selected books from a much larger number based on the quality of scans that could be obtained and the ability to identify a book's date and place of publication; they included both popular and academic works (Michel et al., 2011).

The Google Ngram Viewer includes books published between 1600 and 2008. However, the number of books digitized is small for the first two centuries, especially in the United States; therefore, the present analysis started with the year 1800, the point at which the number of books per year in both the United States and United Kingdom samples rose to more than 100,000 per century.

The analysis ended with the year 2000 rather than 2008 for two reasons. The first reason was methodological: Google had a constant methodology for selecting books up through 2000, but a somewhat different method after 2000. By stopping in 2000, a constant sampling method was ensured. The second reason for stopping at 2000 had to do with the availability of corresponding decennial census data: Ceasing data collection at 2000 provided the same ending date for both census data on urban residence in the United States (Fig. 1) and word-frequency data from the U.S. corpus of the Google Ngram Viewer (Figs. 2–5).

Analysis of historical trends in word frequency

When exploring single words, the Ngram Viewer graphs the percentage of each word in each year by dividing the number of instances of the word in a particular year by the total number of words in that year. Both methodologically and conceptually, it was important to use high-frequency words in the analyses. Methodologically, high frequency was important so that graph lines would rise above zero and could therefore index cultural change over time. The creators of the Google Ngram Viewer point out that "the most robust historical trends are associated with frequent n-grams" (Michel et al., 2011, Supporting Online Material, p. 12). Conceptually, high frequency was important so that the words would be significantly characteristic of U.S. culture as a whole (and in the replication sample, British culture as a whole).

Another criterion for word selection was a relatively narrow range of semantic interpretations. Broad meanings imply that a word can be used in many contexts, including those irrelevant to the cultural value the word was intended to index. A conceptually relevant word with a narrower range of semantic interpretations implies contexts more frequently targeted to the relevant cultural value. Although phrases could potentially be more targeted than individual words, particular two-word combinations would be too infrequent in the corpus to show change over time and therefore could not be utilized in the analysis.

A closely related third criterion for selection of words was theory relevance. Thus, for example, "choose" was utilized in preference to "want" because freedom of choice is, by definition, a defining attribute of individualism (Realo, Koido, Ceulemans, & Allik, 2002). "Obliged" was chosen in preference to "must" because "family obligation" is an important component of values that are adapted to a rural village environment (Manago & Greenfield, 2011).

Steps were taken to ensure that the selected words reflected underlying concepts rather than the idiosyncrasies of particular words or parts of speech. *Roget's Thesaurus* was used to generate a synonym for every word graphed in Figures 2 through 5. The thesaurus provides noun synonyms for verbs (or adjectives) and verb synonyms for nouns. Noun synonyms were selected for verbs and adjectives graphed in Figures 2 through 4; verb synonyms were selected for the nouns. For the words in Figure 5, synonyms were not always available from a different part of speech; in that case, a synonym

representing the same part of speech was used. When the synonym's pattern of relative frequency change over time replicated that of the original word, the finding was considered to manifest an underlying concept that was independent of a particular word or part of speech.

Because every percentage is based on a denominator of total number of words published in about 1,160,000 books (U.S. sample) or about 350,000 books (British sample), the absolute percentage of any individual word is of necessity small. For example, the highest percentage in the graphs shown in Figures 2 through 5 is slightly more than .045% ("give"; Fig. 3). This percentage means that the word occurs 45 times in every 100,000 words. However, what are meaningful are relative trends over time. For example, the word "get" in the same graph starts in the year 1800 with a frequency of about 10 occurrences per 100,000 words but quadruples in frequency to about 40 occurrences per 100,000 words by the year 2000. It is this quadrupling that is meaningful for the present investigation.

Ecological analysis

Because the prediction was that ecological conditions drive cultural change, it was important to assess ecological change in the United States from the year 1800. Urban-rural residence is the only ecological variable that has been tracked in the U.S. census from 1800 to the present. The operational definition of *urban population* through 1960 was people "living in incorporated places of 2,500 inhabitants or more and in areas (usually minor civil divisions) classified as urban under special rules relating to population size and density" (U.S. Census Bureau, 1953, p. 9). From 1950, the definition was as follows:

> . . . all persons living in (a) places of 2,500 inhabitants or more incorporated as cities, boroughs, and villages, (b) incorporated towns of 2,500 inhabitants or more incorporated as cities, boroughs, and villages, (c) the densely settled urban fringe, including both incorporated and unincorporated areas, around cities of 50,000 or more, and (d) unincorporated places of 2,500 inhabitants or more outside any urban fringe. (U.S. Census Bureau, 1953, p. 9)

As Figure 1 shows, the Census Bureau used both definitions in 1950 and 1960, which allows one to see how they relate to each other. In 2000, the definition changed to densely settled territory, termed "urbanized areas" and "urban clusters." In all definitions of "urban," the remaining population is considered rural.

Because the concept of a gesellschaft (or a gemeinschaft) environment encompasses multiple variables that operate synergistically and interactively, the ideal would probably have been a composite variable consisting of measures such as urban-rural residence, median family income, average level of formal education, and household penetration of various technologies. Because these latter measurements are not available over this span of time and because all of these ecological variables are seen as equipotential, urban and rural residence have been used as stand-ins for the whole complex of gesellschaft and gemeinschaft components.

Results

Figure 1 shows that, in 1800, the United States was overwhelmingly rural: 93.9% of the U.S. population lived in places with populations of fewer than 2,500 people (U.S.

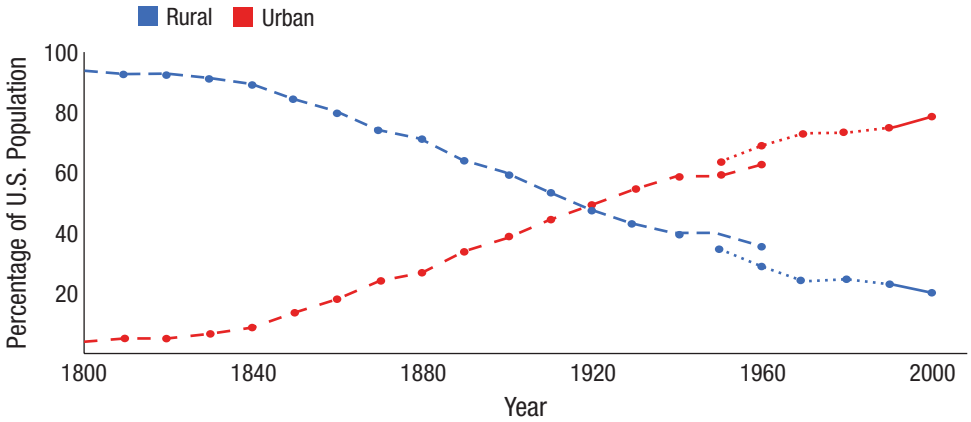

Fig. 1. Percentage of U.S. population living in rural and urban areas from the years 1800 to 2000. Data were drawn from the following sources—1800–1980: U.S. Census Bureau (2004); 1990: U.S. Census Bureau (1992); and 2000: U.S. Census Bureau (2004). The definition of *urban population* changed over the years, and two different definitions were both used in 1950 and 1960, so there are double data points for those years (for details, see Ecological Analysis in the text).

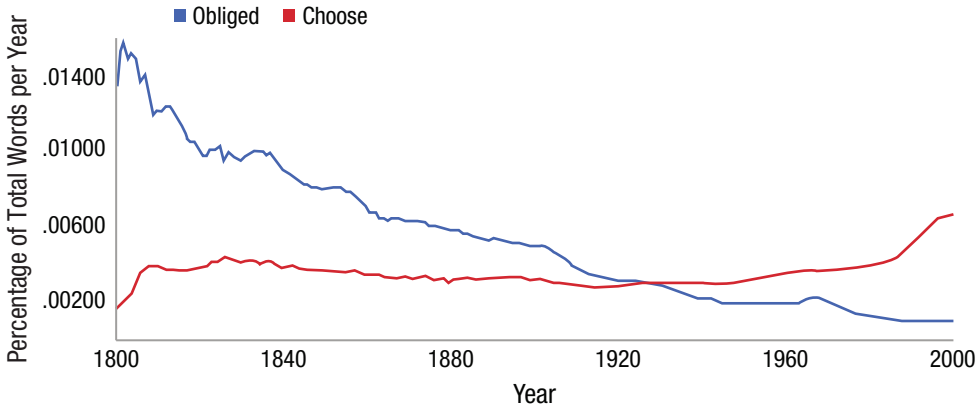

Fig. 2. Frequency of the words "obliged" and "choose" in the Google corpus of American English books from the years 1800 to 2000. The graph was made with the Google Books Ngram Viewer (Michel et al., 2011), with a smoothing of 3.

Census Bureau, 1983). By 2000, the United States was predominantly urban, with 79.0% of the population living in urban areas (U.S. Census Bureau, 2004). Because a sample of British books was used to replicate and generalize the U.S. findings, it is important to note that the population of the United Kingdom also became progressively more urban across these same two centuries (Monkkonen, 1988; World Bank, 2012).

I now turn to data from the Google Books Ngram Viewer to demonstrate the cultural changes predicted to be correlated with the rural-urban transition between 1800 and 2000. The first contrast, between obligation (gemeinschaft adaptation) and choice (gesellschaft adaptation), used the words "choose" and "obliged" to index the two contrasting cultural values. In correlation with the historical rise of urban residence and the corresponding fall of rural residence from 1800 to 2000, the prediction was that the relative frequency of "choose" would increase and the relative frequency of "obliged" would decrease over this time period. Figure 2 shows that this was indeed the case.

To show that this chronological patterning of "choose" and "obliged" was a function of underlying constructs rather than idiosyncratic to particular words or parts of speech, I selected two noun synonyms—"decision" (noun synonym of the verb "choose") and "duty" (noun synonym of the adjective "obliged"). The pattern of frequency change was similar to that shown in Figure 2: "duty" (gemeinschaft adaptation) declined between 1800 and 2000 to less than one-third of its initial level, whereas "decision" (gesellschaft adaptation) showed a 5-fold increase. As in Figure 2, the gemeinschaft-adapted member of the pair was more frequent in 1800 than the gesellschaft-adapted member of the pair. And as with "choose" and "obliged," relative frequencies were reversed by 2000, with "decision" having become more than twice as frequent as "duty."

Can these relationships and trends be generalized to other parts of the world, as the theory of social change and human development would predict? This question was addressed by analyzing data from British books published between 1800 and 2000. As the United Kingdom shifted from rural to urban in this period, analysis of word frequencies in British books showed a parallel cultural shift to that found in the United States: "Obliged" and "duty" (indexing important gemeinschaft-adapted values) declined in frequency, whereas "choose" and "decision" (indexing important gesellschaft-adapted values) rose in frequency between 1800 and 2000.

The contrast between contributing to the welfare of other people and obtaining something for oneself was indexed by "give" and "get." The prediction was that, as urban populations expanded, the relative frequency of "give" would decrease and the relative frequency of "get" would increase. Figure 3 confirms this hypothesis: "Give" became less frequent, and "get" became more frequent, between 1800 and 2000. However, there was also short-term deviation from this pattern between 1940 (entry of the United States into World War II) and the 1960s (civil rights movement). During that period, the frequency of "get" declined as well, perhaps reflecting a decline of self-interest motivation during World War II and the civil rights movement. "Get" starts to rise again in the 1970s, perhaps because of the onset of the women's movement. The 1970s are the point at which the final crossover takes place, with "get" becoming more frequent than "give" from that time until the final year studied, 2000. The important point is that, over the long haul, "give" declines whereas "get" increases in relative frequency, correlated with increasing levels of urban residence, as predicted.

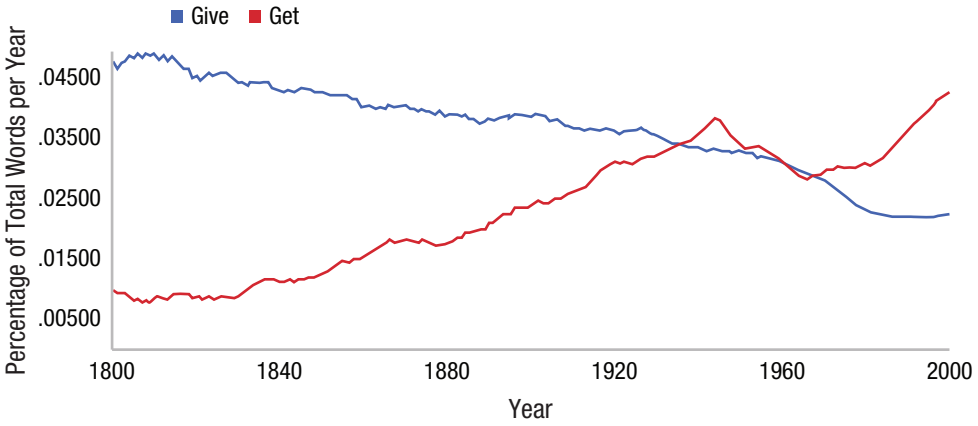

Fig. 3. Frequency of the words "give" and "get" in the Google corpus of American English books from the years 1800 to 2000. The graph was made with the Google Books Ngram Viewer (Michel et al., 2011), with a smoothing of 3.

To replicate these findings, I identified "benevolence" as a noun synonym for the verb "give," whereas "acquisition" was identified as a noun synonym for the verb "get." Replicating the pattern in Figure 3, the frequency of "benevolence" declined from 1800 to 2000, whereas the frequency of "acquisition" rose. Again the pattern of cultural change also generalized to the United Kingdom. Between 1800 and 2000, "give" and "benevolence" declined in frequency in British books, whereas the frequency of "get" and "acquisition" rose.

A contrast between "act" and "feel" was used to index the fact that, in gemeinschaft environments, people understand the social world in terms of action or behavior, whereas in gesellschaft environments, they understand it in terms of inner psychological processes. Figure 4 shows a gradual rise in the relative frequency of "feel" over the centuries, with a corresponding decline in the relative frequency of "act," as predicted. Although there is an unexplained rise in the frequency of "act" between 1800 and 1820, its frequency nonetheless ends up at a lower point in 2000 than its starting point in 1800. "Feel" becomes more frequent than "act" in the 1970s.

The thesaurus yielded "deed" as a noun synonym for the verb "act" and "emotion" as a noun synonym for the verb "feel." The chronological pattern was once again the same: The frequency of "emotion" almost doubled between 1800 and 2000, whereas the frequency of "deed" declined by 2000 to less than one-third of its level in 1800. Again, the cultural shift was replicated in the United Kingdom: "Act" and "deed" declined in frequency in British books over a 200-year period, whereas "feel" and "emotion" rose in frequency.

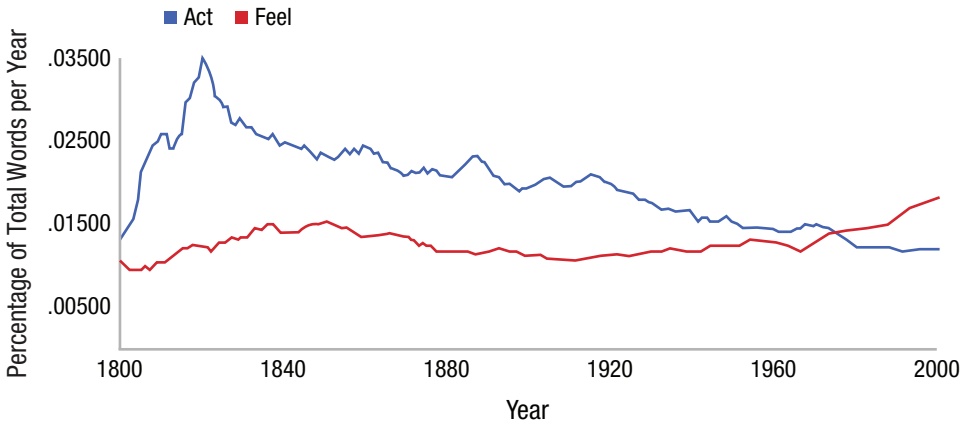

Fig. 4. Frequency of the words "act" and "feel" in the Google corpus of American English books from the years 1800 to 2000. The graph was made with the Google Books Ngram Viewer (Michel et al., 2011), with a smoothing of 3.

To complement the trends manifest in these antonyms and to enlarge the scope of the data, I selected additional concepts to illustrate this historical pattern of value change. The top panel of Figure 5 illustrates the rise in importance of child-centered socialization to develop the unique individual self in a gesellschaft world: The words "child," "unique," "individual," and "self" increased in frequency from 1800 to 2000. The bottom panel illustrates the simultaneous decline in relative importance of obedience to authority, social relationships, and religion in everyday life: "Obedience," "authority," "belong," and "pray" decline in frequency in this same 200-year period.

Synonyms were again identified for all of these words; however, because of the nature of the list, most were from the same part of speech. Synonyms for "child," "unique," "individual," and "self," important developmental concepts in a gesellschaft world, were "baby," "special," "personal," and "ego," respectively. Each synonym rose in frequency from 1800 to 2000. Synonyms for "obedience," "authority," "pray," and "belong," important aspects of adaptation to a gemeinschaft world, were "conformity," "power," "worship," and "join." As predicted, all declined in frequency from 1800 to 2000. These patterns of decline or rise in frequency over time were replicated for each word in the corpus of British books.

Discussion

Comparing the antonyms in Figures 2 through 4, one sees that choice is the first of the three individualistic adaptations to become culturally dominant in the United States (around 1930; Fig. 2), with materialism (indexed by "get") and focus on interior psychology (indexed by "feel") following in the 1970s (Figs. 3 and 4, respectively). This time course may be at least partly a reflection of the historical shift from individualism in the political arena, which includes the importance of choice, to expressive individualism, which emphasizes the individual psyche (cf. Inglehart & Baker, 2000; Yankelovich, 1998). The interpretation of the rise of "feel" and "emotion" as a manifestation of the growing importance of psychological expression on the cultural level is corroborated by

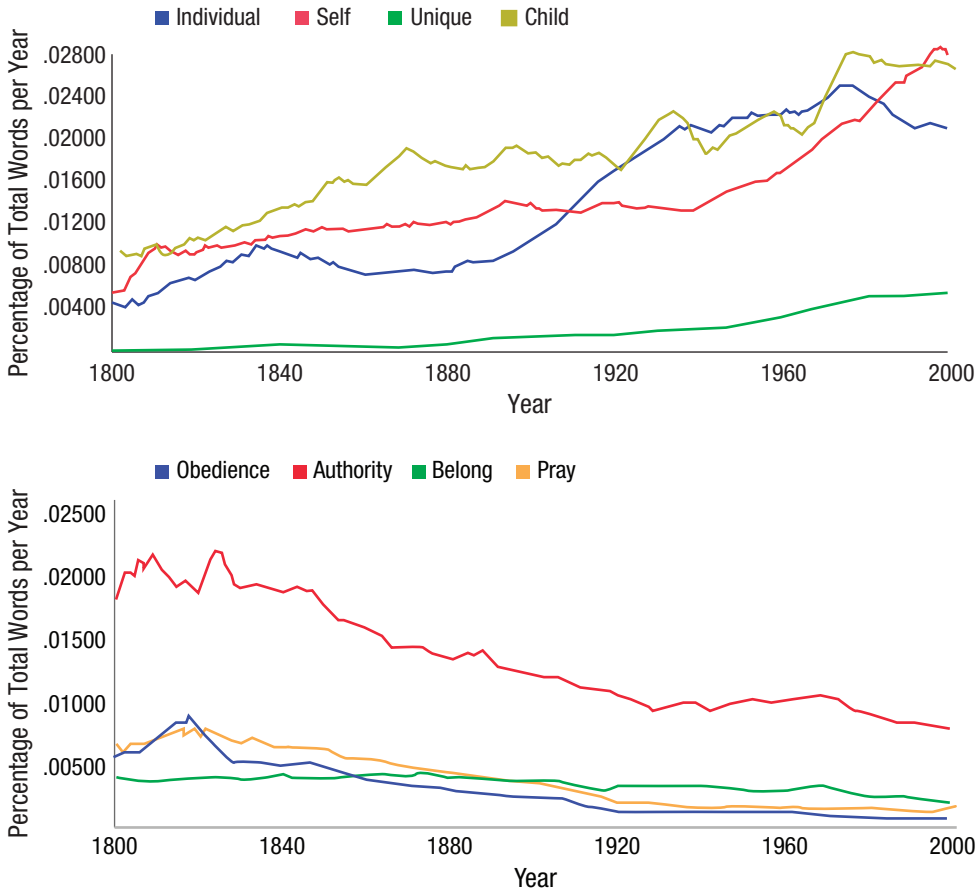

Fig. 5. Frequency of words indexing gesellschaft-adapted values (top panel) and words indexing gemeinschaft-adapted values (bottom panel) from the years 1800 through 2000. The graph was made with the Google Books Ngram Viewer (Michel et al., 2011), with a smoothing of 3.

survey data that reveal a corresponding rise of narcissistic personality traits on the individual level from the 1970s to 2006 among U.S. college students (Twenge, Konrath, Foster, Campbell, & Bushman, 2008). The increase in frequency of "individual," "self," "unique," "special," and "ego" between 1800 and 2000 expands the chronological scope of Twenge and her colleagues' (2012, 2013) demonstration of the increase in individualistic words in the Google database from 1960 onward. Interpreting the rise of "get" and "acquisition" as manifestations of materialistic values on the cultural level is corroborated by survey data showing growing materialism on the individual level over recent decades among college students (Twenge, Campbell, Hoffman, & Lance, 2010) and in cultural products (Uhls & Greenfield, 2011).

Because of the lag in book publication (relative to newspapers and magazines), the Google Ngram Viewer is a more useful tool for analyzing long-term rather than short-term trends. Indeed, in Figures 2 through 5, many temporary reversals of otherwise consistent trends are visible. These can be due to many factors, such as short-term reversals in long-term ecological trends, historical events, or political movements. However, long-term trends were the subject of the current analysis, and a remarkable consistency in long-term U.S. trends is visible in Figures 2 through 5, supported by their replication using synonyms and different parts of speech, and their replication with British books.

In summary, as the U.S. transformed from rural to urban between 1800 and 2000, culture, as reflected in more than a million American books, also transformed. With parallel social change occurring in the United Kingdom, the replication sample of British books revealed similar culture change over this period of time. These findings signify that books as cultural products reflect human ecology. They also signify that cultural features can be indexed by word-use frequencies, which, in turn, reflect what is prioritized by a population. As predicted by the theory of social change and human development, obligation, duty, obedience to authority, social belongingness, giving to other people, religion, and action, all of which are hypothesized to be adaptive in a rural—or, more generally, a gemeinschaft—environment, declined in importance over this period of two centuries. In this same period, choice, obtaining things for oneself, child centeredness, psychological mindedness, and the unique, individual self, all of which are hypothesized to be adaptive in an urban—or, more generally, a gesellschaft—environment, augmented in importance. The replication of U.S. findings with British books shows that the predicted results are not dependent on a particular national context or a particular set of books. This replication constitutes strong evidence for the generality of the theoretical model and, more specifically, its cross-national generalizability.

A new technology in the digital humanities enabled a broader view of how cultural values are shifting, trends that can be seen over the large spans of time covered by the Google Books Ngram Viewer. This analysis indicates the value of both the Google Books Ngram Viewer (Michel et al., 2011) as a tool for detecting cultural change and the value of the theory of social change and human development (Greenfield, 2009) for using ecological trends to predict changes in the psychology of culture. Often, people think of radical ecological change from rural to urban as taking place only in the developing world. Indeed, similar ecological changes in developing countries such as Turkey have shown accompanying cultural changes toward individualism (Lerner, 1958). The present analysis makes it clear that the very same transition has occurred over a much longer period of time in the so-called developed world—albeit most likely at a slower pace—yet continuing up to the 21st century.

Author Contributions

P. M. Greenfield is the sole author of this article and is responsible for its content.

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Declaration of Conflicting Interests

The author declared that she had no conflicts of interest with respect to her authorship or the publication of this article.

Note

1. The Google Books Ngram Viewer can be found at http://books.google.com/ngrams. Interested readers can use the Ngram Viewer to replicate all patterns of historical change referred to or graphed in the present article. However, Google is constantly adding books to the databases and improving technical aspects of the Ngram Viewer. Therefore, although all historical patterns of word frequency remain the same, details of the graph lines in Figures 2 through 5 have changed. It is notable that "act" (Fig. 4), which shows the most subtle historical change from 1800 to 2000 of all of the word frequencies graphed in Figures 2 through 5, shows a larger decline in the current, expanded Ngram

Viewer database than in the original data set. The original data set used in this article is Version 20090715, available at http://storage.googleapis.com/books/ngrams/books/datasetsv2.html.

References

Chalfant, H. P., & Heller, P. L. (1991). Rural/urban versus regional differences in religiosity. *Review of Religious Research*, *33*, 76–86.

Childs, C. P., & Greenfield, P. M. (1980). Informal modes of learning and teaching: The case of Zinacanteco weaving. In N. Warren (Ed.), *Studies in cross-cultural psychology* (Vol. 2, pp. 269–316). New York, NY: Academic Press.

Demuth, C., Keller, H., & Yovsi, R. D. (2012). Cultural models in communication with infants: Lessons from Kikaikelaki, Cameroon and Muenster, Germany. *Journal of Early Childhood Research*, *10*, 70–87.

Flynn, J. R. (1984). The mean IQ of Americans—Massive gains 1932 to 1978. *Psychological Bulletin*, *95*, 29–51.

Fuligni, A. J., & Zhang, W. (2004). Attitudes toward family obligation among adolescents in contemporary urban and rural China. *Child Development*, *74*, 180–192.

Greenfield, P. M. (1998). The cultural evolution of IQ. In U. Neisser (Ed.), *The rising curve: Long-term gains in IQ and related measures* (pp. 81–123). Washington, DC: American Psychological Association.

Greenfield, P. M. (2009). Linking social change and developmental change: Shifting pathways of human development. *Developmental Psychology*, *45*, 401–418.

Greenfield, P. M., & Bruner, J. S. (1966). Culture and cognitive growth. *International Journal of Psychology*, *1*, 89–107.

Greenfield, P. M., Maynard, A. E., & Childs, C. P. (2003). Historical change, cultural learning, and cognitive representation in Zinacantec Maya children. *Cognitive Development*, *18*, 455–487.

Hofstede, G. (1980). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations*. Beverly Hills, CA: Sage.

Inglehart, R., & Baker, W. E. (2000). Modernization, cultural change, and the persistence of traditional values. *American Sociological Review*, *65*, 19–51.

Kim, H., & Markus, H. (1999). Deviance or uniqueness? Harmony or conformity? A cultural analysis. *Journal of Personality and Social Psychology*, *77*, 785–800.

Kraus, M. W., Piff, P. K., Mendoza-Denton, R., Rheinschmidt, M. L., & Keltner, D. (2012). Social class, solipsism, and contextualism: How the rich are different from the poor. *Psychological Review*, *119*, 546–572.

Krippendorf, K. (2004). *Content analysis: An introduction to its methodology*. Thousand Oaks, CA: Sage.

Lerner, D. (1958). *The passing of traditional society*. New York, NY: Free Press.

Manago, A. M. (2012). The new emerging adult in Chiapas, Mexico: Perceptions of traditional values and value change among first-generation Maya university students. *Journal of Adolescent Research*, *27*, 663–713.

Manago, A. M., & Greenfield, P. M. (2011). The construction of independent values among Maya women at the forefront of social change: Four case studies. *Ethos*, *39*, 1–29.

Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion and motivation. *Psychological Review*, *98*, 224–253.

Michel, J.-B., Shen, Y. K., Aiden, A. P., Veres, A, & Gray, M. K., The Google Books Team, . . . Aiden, E. L. (2011). Quantitative analysis of culture using millions of digitized books [With supporting online material]. *Science*, *331*, 176–182.

Monkkonen, E. H. (1988). *America becomes urban: The development of U.S. cities & towns 1780–1980*. Berkeley: University of California Press.

Na, J., Grossmann, I., Varnum, M. E. W., Kitayama, S., Gonzales, R., & Nisbett, R. E. (2010). Cultural differences are not always reducible to individual differences. *Proceedings of the National Academy of Sciences, USA*, *107*, 6192–6197.

National Committee of Inquiry Into Higher Education. (1997). *Report of the National Committee, Chapter 3: Higher education today*. Retrieved from http://www.leeds.ac.uk/educol/ncihe/nr_017.htm

Ochs, E., & Schieffelin, B. B. (1984). Language acquisition and socialization: Three developmental stories. In R. A. Shweder & R. A. LeVine (Eds.), *Culture theory: Essays on mind, self, and emotion* (pp. 276–320). Cambridge, England: Cambridge University Press.

Park, H., Twenge, J. M., & Greenfield, P. M. (2013). The Great Recession: Implications for adolescent values and behavior. *Social Psychological and Personality Science*. Advance online publication. doi:10.1177/1948550613495419

Piff, P. K., Kraus, M. W., Côté, S., Cheng, B. H., & Keltner, D. (2010). Having less, giving more: The influence of social class on prosocial behavior. *Journal of Personality and Social Psychology*, *99*, 771–784.

Raeff, C., Greenfield, P. M., & Quiroz, B. (2000). Conceptualizing interpersonal relationships in the cultural contexts of individualism and collectivism. In S. Harkness, C. Raeff, & C. M. Super (Eds.), *New directions for child and adolescent development* (pp. 59–74). San Francisco, CA: Jossey-Bass.

Realo, A., Koido, K., Ceulemans, E., & Allik, J. (2002). Three components of individualism. *European Journal of Personality*, *16*, 163–184. doi:10.1002/per.437

Stone, P. J., Dunphy, D. C., & Smith, M. S. (1966). *The general inquirer: A computer approach to content analysis*. Oxford, England: MIT Press.

Tönnies, F. (1957). *Community and society* (C. P. Loomis, Ed. & Trans.). East Lansing: Michigan State University Press. (Original work published 1887)

Triandis, H. (1989). The self and social behavior in differing cultural contexts. *Psychological Review*, *96*, 506–520.

Twenge, J. M., Campbell, S. M., Hoffman, B. J., & Lance, C. E. (2010). Generational differences in work values: Leisure and extrinsic values increasing, social and intrinsic values decreasing. *Journal of Management*, *36*, 1117–1142.

Twenge, J. M., Campbell, W. K., & Gentile, B. (2012). Increases in individualistic words and phrases in American books, 1960–2008. *PLoS ONE*, *7*(7), e40181. Retrieved from http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0040181

Twenge, J. M., Campbell, W. K., & Gentile, B. (2013). Changes in pronoun use in American books and the rise of individualism, 1960–2008. *Journal of Cross-Cultural Psychology*, *44*, 406–415. doi:10.1177/0022022112455100

Twenge, J. M., Konrath, S., Foster, J. D., Campbell, W. K., & Bushman, B. (2008). Egos inflating over time: A cross-temporal meta-analysis of the Narcissistic Personality Inventory. *Journal of Personality*, *76*, 875–903.

Uhls, Y. T., & Greenfield, P. M. (2011). The rise of fame: An historical content analysis. *Cyberpsychology*, *5*(1), Article 1. Retrieved from http://www.cyberpsychology.eu/view.php?cisloclanku=2011061601

U.S. Census Bureau. (1953). *U.S. census of population: 1950, Vol. II: Characteristics of the population*. Washington, DC: U.S. Government Printing Office.

U.S. Census Bureau. (1983). *1980 census of population, number of inhabitants, United States summary* (Table 3, p. 35). Washington, DC: U.S. Government Printing Office.

U.S. Census Bureau. (1992). *1990 census of population: Social and economic characteristics, United States* (Table 1, p. 1). Washington, DC: U.S. Government Printing Office.

U.S. Census Bureau. (2004). *2000 census of population and housing: United States summary: 2000: Population and housing counts* (Table 3, p. 35). Washington, DC: U.S. Government Printing Office.

Varnum, M. E. W., Grossman, I., Kitayama, S., & Nisbett, R. E. (2010). The origin of cultural differences in cognition: Evidence for the social orientation hypothesis. *Current Directions in Psychological Science*, *19*, 9–13. doi:10.1177/0963721409359301

World Bank. (2012). *Data*. Retrieved from http://data.worldbank.org/indicator

Yankelovich, D. (1998, February/March). How American individualism is evolving. *The Public Perspective*, *9*(2). Retrieved from http://www.ropercenter.uconn.edu/public-perspective/ppscan/92/92003.pdf