A Comprehensive Taxonomy of Human Motives: A Principled Basis for the Motives of Intelligent Agents

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Abstract. We present a hierarchical taxonomy of human motives, based on similarity judgments of 161 motives gleaned from an extensive review of the motivation literature from McDougall to the present. This taxonomy provides a theoretically and empirically principled basis for the motive structures of Intelligent Agents. 220 participants sorted the motives into groups, using a Flash interface in a standard web browser. The co-occurrence matrix was cluster analyzed. At the broadest level were five large clusters concerned with Relatedness, Competence, Morality and Religion, Self-enhancement / Self-knowledge, and Avoidance. Each of the broad clusters divided into more specific motives. We discuss using this taxonomy as the basis for motives in Intelligent Agents, as well as its relationship to other motive organizations.

Keywords: Human goals, human motives, motive taxonomy, motivation.

1 Introduction

Despite the fundamental role of goals and motives in human behavior, we have only the sketchiest idea of how they are structured and organized [1]; no consensually accepted, comprehensive, empirically based taxonomy of human motives exists. This lack of an accepted structure of human motivation undermines our ability to construct Intelligent Agents driven by psychologically valid models of motivation. Given the lack of a comprehensive taxonomy, our agents' models of human motivation must, of necessity, be somewhat ad hoc. Moreover, absence of an accepted structure obstructs communication among researchers, inhibits research, and slows theory development.

Although there has been considerable empirical work on the structure of human personality, as represented by the Big Five and related research, far less has been done on human motives and no agreed upon structure exists. The current project is focused on developing a comprehensive taxonomy of human motives.

A comprehensive taxonomy would greatly facilitate work on Intelligent Agents. It would provide a common framework for the construction of motivational systems in Intelligent Agents and would aid in the comparison of different models. Currently, researchers' choice of goals and motives tends to be relatively opportunistic or ad hoc, with different researchers choosing from different motivational accounts. This makes comparison and integration across models difficult and reduces our ability to

generalize. A further benefit is that because the motives are hierarchically structured, from more specific to more abstract and general, it allows the researcher to choose the level at which they want to operate, while still providing a structure for comparing across models. Finally, the current taxonomy also helps to address the perennial question of where the goals of an agent come from.

Although several researchers have attempted such a taxonomy (e.g., [2] [3] [4]), all have serious limitations. In previous work we [5] took initial steps toward addressing these limitations. We developed a much more comprehensive list of human motives than had been previously examined and from that generated a taxonomy of human motives that was based on a wide search of the constructs used in the motivational literature and that was empirically, rather than theoretically, generated. This resulted in a hierarchical taxonomy of 135 human motives consisting of 30 lower level clusters organized into progressively broader and more abstract categories.

However, our taxonomy still had several limitations. First, some of the clusters only had 2 motives, which did not provide for a stable cluster. Second, our taxonomy contained few Avoidance motives, things that people are motivated to avoid, such as social rejection or anxiety. However, a growing body of work clearly distinguishes between an Approach system that governs approach to rewarding stimuli and an Avoidance system that governs avoidance of aversive stimuli (e.g., [6] [7]). Thus, we needed a broader sample of motives. Third, our original sample of participants was small and limited, reducing the stability and generalizability of our results. The present study aims to address these limitations and further develop our taxonomy so as to provide a stronger foundation for work on motivated human behavior.

We used similarity judgments by naïve subjects as our guide to the motivational structures underlying people's behavior. We first generated an extensive set of motives based on a thorough review of the human motivation literature. We then had a large number of subjects sort 161 motives into categories on the basis of their semantic similarity, and then applied hierarchical cluster analysis to these judgments. This study was aimed at generating a comprehensive taxonomy of human motives that would: (1) include a comprehensive set of motives sampled from human motivational domains, and (2) tap into laypeople's conceptual organization.

2   Method

Motive selection. We started with the 135 motives from our earlier work [5]. We then identified additional motives that had not been in our earlier set, by drawing from a web study that asked respondents to list motives that characterized individuals described by each of 43 trait adjectives taken from the Big 5 dimensions. Finally, we added motives deemed central to recent theoretical accounts of motivation. One example is Avoid Impure Acts, related to Disgust and aspects of religion. We ended up with 161 motives.

Motive sorting. The categorization task was implemented as a Flash program inside a standard Web browser. The interface consisted of a scrolling list of the motives on the left side of the screen and a sorting area, which took up the remainder of the screen. Participants were asked to sort the motive into groups on the basis of their

similarity. They sorted the motives by dragging them from the list, one at a time, onto the sorting area. If a motive was dragged onto an empty spot in the sorting area, the motive box changed into a category box. Additional motives could be dragged into this category box or dragged to empty parts of the sorting area to form new category boxes. Motives dragged to the sorting area were removed from the list. The "I'm done" button became active once participants had sorted at least 90 of the motives, but participants could continue to sort until they had sorted all 161 motives. The program continuously recorded participants' sorting throughout the entire sorting task.

Sample recruitment and demographics. Participants were recruited from the USC Psychology Department Subject pool, from regular visitors to the yourmorals.org website, which recruits participants to fill out a wide range of psychological measures, and through the use of online ads through Google, Yahoo, and ASK.com. 612 individuals sorted at least one motive, 438 individuals sorted at least 90 motives, which is the point at which the "I'm done" button became active, and 220 individuals sorted all 161 motives. Ages ranged from 18 to 70, about 60% of the sample was women, and about 70% were White.

3   Results

The sorting data was analyzed using hierarchical cluster analysis, with the number of times each pair of items was sorted into the same category treated as a measure of similarity. Higher numbers mean that the pair of items was viewed as more similar. The matrix of proximities or similarities was then analyzed using a cluster analysis technique called Ward's [8] method or Increasing Sums of Squares. This method is also known as the "within-groups sum of squares or the error sum of squares (ESS)" method and is designed to optimize the minimum variance within clusters. It outperforms other clustering methods in many cases. We analyzed the data from the 220 individuals who sorted all 161 motives. This is a large sample for this kind of motive analysis and should provide a fairly stable estimate.

The results seem clear. We separately examine five broad clusters and the lower level clusters that constitute them. A condensed version of the cluster diagram that combines some of the lowest level clusters is in Figures 1a and 1b. The original diagram and a complete list of the 161 motives are available from the first author.

3.1   Hierarchical Structure

At the broad level there is a strong correspondence between our results and other accounts of the structure of human motives. For example, Self-determination theory [9] argues that there are three basic psychological needs that people try to satisfy: Competence, Relatedness, and Autonomy. Relatedness and Competence are particularly clear in the current structure (see Figures 1a and 1b) and there is also evidence for clusters concerned with Autonomy although the structure is not as clear.
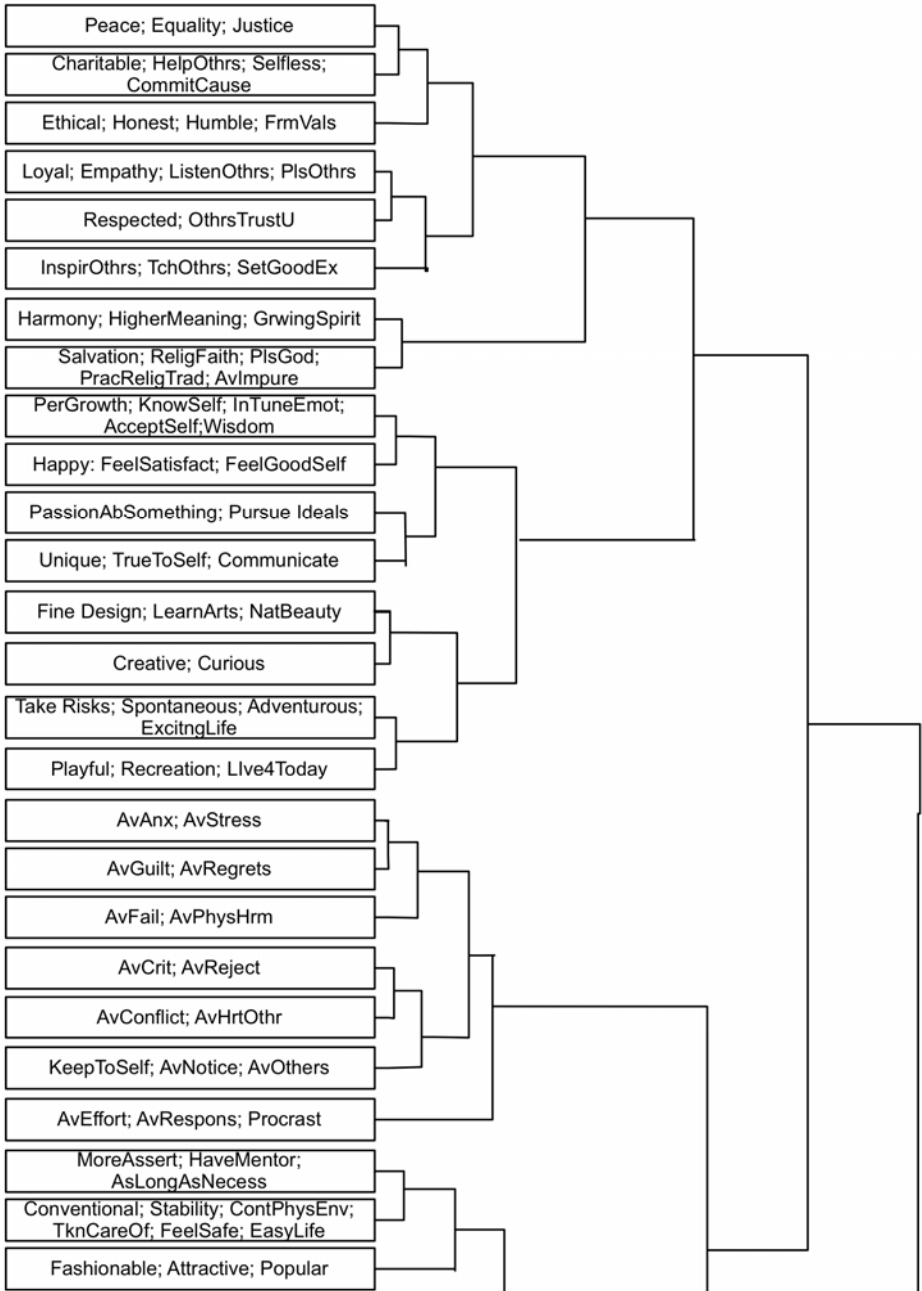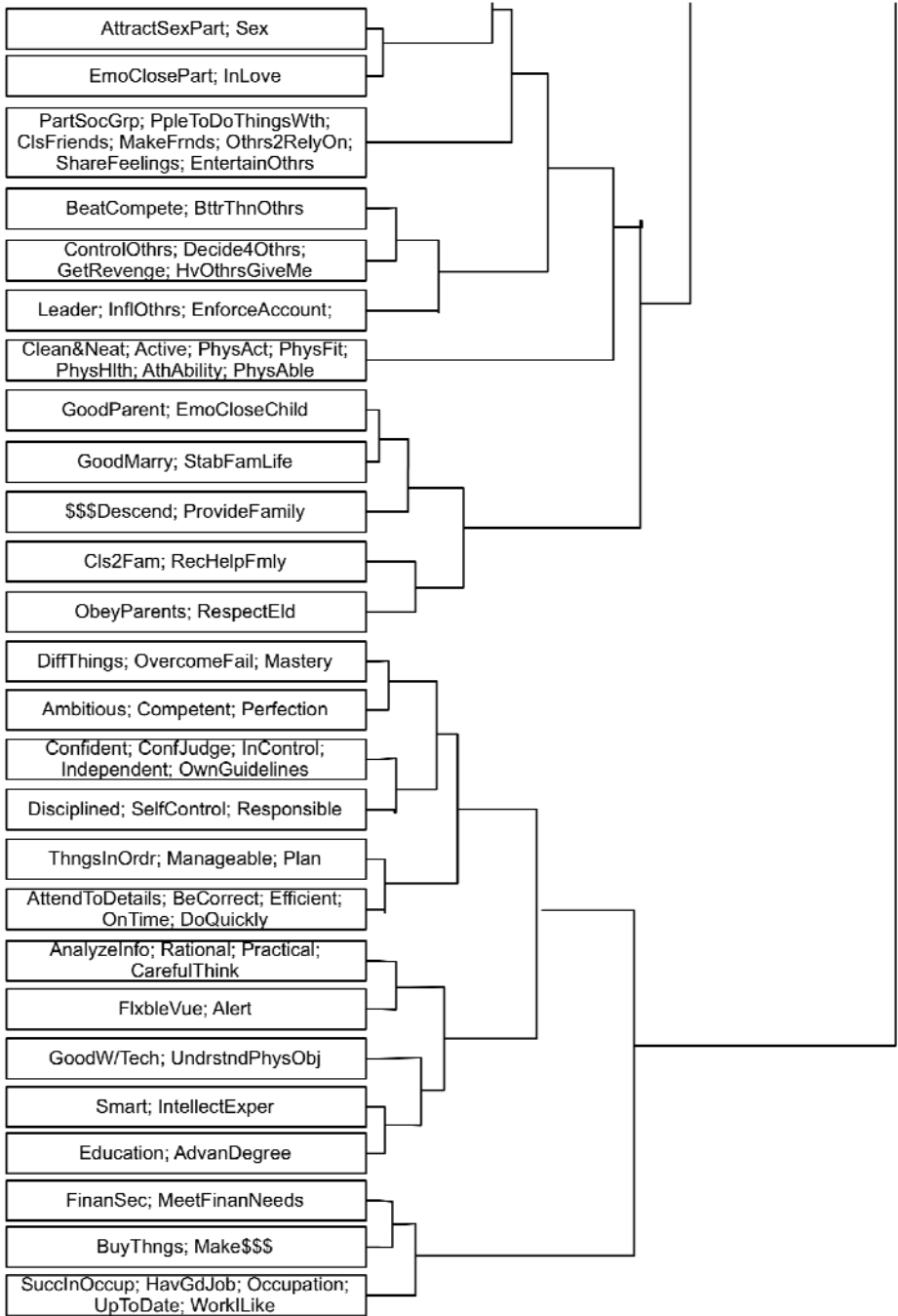
Fig. 1a. Condensed taxonomy, top half

Fig. 1b. Condensed taxonomy, bottom half

A distinction similar to that between Competence and Relatedness is the frequently made distinction between Agentic and Communal orientations (e.g., [10]), which maps roughly onto Competence and Relatedness in Self-determination Theory. An Agentic orientation is focused on the individual achieving and doing things. In contrast, a Communal orientation is more group or community focused and is focused more on interactions with others and such things as caring for others.

The first high level cluster, at the top of the diagram (Figure 1a), is composed of two major clusters. One is a Morality, Religion, and Spirituality cluster. This cluster divides into one clear cluster concerned with religious faith and expression, a closely related, but separate cluster dealing with spirituality more generally, and a clear cluster dealing with two aspects of morality and ethics (e.g., peace and justice, helping others, ethical and honest; loyalty and listening to others, being respected and trusted, teaching and inspiring others). The other cluster seems to be something like Self-determination theory's Autonomy or something like a need for Self-Knowledge, with one cluster being concerned with personal growth, self-knowledge, and being happy and satisfied with the self, a second cluster concerned with being unique and passionate about something, a third cluster focused on aesthetics, natural beauty, and creativity/curiosity, and a final cluster consisting of adventurousness and playfulness.

The middle large cluster (spanning Figures 1a and 1b) is composed almost entirely of two sub clusters, one concerning Avoidance motives, which breaks down into a cluster concerning such things as avoiding stress, guilt, failure, or physical harm, a second cluster dealing with social avoidance, such as avoiding rejection/criticism, and conflict with others, and a third cluster concerned with avoiding effort or work.

The second subcluster of Relatedness or Communal motives has to do with various aspects of social interaction/relatedness with others. Within this, the top cluster seems to deal with desire for stability and safety and being popular or attractive. The next cluster (Sex/Love) consists of two closely related clusters, one having to do with attracting a sex partner and having sexual experiences and the other with being in love and emotionally close to a partner. The next cluster consists of a large number of motives having to do with affiliation and friendship. The next cluster seems to deal with issues of dominance and leadership. There is then a coherent cluster of items concerned with physical health, physical ability and physical activity.

The final set of clusters in the Relatedness cluster deal with various aspects of family. One cluster deals with parent-child relationships, another with marriage itself, and a third with providing for family. Then there are two related clusters that seem to deal more with one's relationship to one's own parents and siblings: being close to family and receiving help from family, and obeying parents and respecting elders.

The motives on the last large cluster (Figure 1b) clearly are related to Competence and Agency. Within this cluster we first see a cluster concerned with mastery and competence, followed by a cluster concerned with being confident, in control of self and environment, and being disciplined. Second, there is a cluster dealing with conscientiousness, a desire for things in order and a desire to be correct, efficient and on time. Third, there is a cluster that consists of items related to thinking and analyzing information, and being rational. Fourth, we see a cluster related to understanding physical objects and systems, being smart and having intellectual experiences, and being highly educated. The final cluster concerns financial security and making money, as well as having a good job and being successful in it.

4   Conclusion

This provides a remarkably coherent view of the structure of human motivation. The broad level of the taxonomy has strong parallels with broad distinctions made by other theorists, and the more specific levels of the hierarchy exhibit coherent clusters of motives that systematically join together into higher-level structures.

The current taxonomy has a number of advantages over previous attempts, including our own. It is based on a wider sample of motives, sampling more extensively from domains that have previously been under sampled. Moreover, it provides a consistent, replicable structure over a broader sample of participants. The taxonomy provides those interested in human motivation with a broad framework for the study and assessment of human motives, and their role in social behavior.

This taxonomy provides a firmer foundation for the construction of Intelligent Agents. Rather than making relatively ad hoc or intuitive choices of motives for an agent, the current comprehensive taxonomy of human motives can serve as the basis for the planning and decision making mechanisms of Intelligent Agents. This taxonomy provides a comprehensive structure of human motivation that helps identify which motives and goals an agent should have and why.

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