Running head: STRUCTURE OF SOCIAL/PERSONALITY PSYCHOLOGY

Where is the personality in social/personality psychology?

Examining the structure of contemporary scholarship

Abstract

The structure of social/personality psychology, including the relationship between "social" and "personality," is empirically examined using diverse methods including network, community, and differential language analyses. In a study of keywords, both attitudes and social cognition and group processes appeared as communities; the role of personality was more diffuse. In a larger analysis of citations for four journals, personality appears as a large community which surrounds a well-defined core (the Five-Factor model) but which lies on the periphery of social/personality psychology. Interpersonal relations and attachment are central in social/personality, and appear largely distinct from the study of groups. Attitudes and social cognition are broadly studied, but, in contrast with personality and interpersonal relations, are not structured around a simple core. These methods and results collectively inform the relationship between personality and social psychologies, and provide a step towards an empirical understanding of the discipline.

Keywords: disciplinary structure, network, language analysis, bibliometrics, personality

Where is the personality in social/personality psychology?

An initial examination into the structure of contemporary scholarship

Personality traits vary in their proximity: Some pairs of constructs, such as sociability and energy, are closer than others, such as anxiety and ambition. The finding that a five-dimensional space is sufficient to account for much of this variability has arguably been the equivalent of a paradigm shift for the field (John, Naumann, & Soto, 2008). Just as personality traits vary in proximity, a similar claim may be made for other entities in social and personality research: Some methods, institutions, papers, scholars, and constructs (e.g., interpersonal attraction and marriage) appear closer than others (emotion regulation and post-traumatic growth). Yet our understanding of *the latent structure of social/personality research* remains grounded in anecdote and tradition rather than data.

What is the relationship between "personality" and "social"?

Questions concerning the structure of science are of interest to many disciplines (Borner et al., 2012), but are of particular relevance to social and personality psychology. At the broadest level of description, there is no consensus on the relationship between (or within) 'social' and 'personality' psychologies. Swann & Selye (2005) see personality as resurgent within a field which is increasingly unified, speaking of personality's "emerging symbiosis" with social. Tracy, Robins, & Sherman (2009) note continued differences, with the two areas of personality and social continuing to echo Cronbach's (1957) two disciplines of scientific psychology – in essence, the correlational and experimental.

The unsettled relationship between personality and social psychologies is reflected in the labeling of graduate programs. Of the major programs in social/personality in the United States and Canada, the majority (32 programs) include the label “social” without “personality.” At 21 others, the terms are combined in a single area fused by *ands*, *ampersands*, *hyphens*, *slashes*, or (in one case) a *vertical bar*. At four universities, social and personality are presented in separate areas of study. Across programs, the accuracy of these different labels is uneven; rather, despite the best intentions of department committees, the contents of programs in social, social/personality, and personality psychology likely reflect Kelley’s (1927) ‘jingle-jangle fallacy’, in which similar entities may be labelled differently, and quite different ones assigned the same name (see Table 1).

One approach to understanding the relationship between personality and social psychologies is to consider them as *communities of scholarship*. These communities, like physical communities framed by constructs such as race and class, may be thoroughly integrated or largely separate. In the extreme, personality might be represented throughout this undifferentiated space, represented equally in the ideas, papers, journals, and programs of social/personality psychology, rendering training and scholarship in ‘social’ and ‘personality’ psychologies as one and the same. Alternatively, social and personality psychology may be largely discrete, with personality existing only in an isolated ghetto of scholarship. On this model, the term ‘social-personality’ is arguably a misnomer, denoting an intersection which is effectively the null set.

Are there more than two social and personality psychologies? It is possible, too, that social and personality would best be understood as more than one or two communities.

Historically, scientific progress since the Enlightenment has been characterized by an increasing differentiation of disciplines, and so one might expect that personality and social psychology are similarly moving towards continuing specialization or fragmentation. This idea is supported by the structure of the *Journal of Personality and Social Psychology (JPSP)*, which since 1981 has been divided into what are effectively three separate journals, *Attitudes and Social Cognition (here, JPSPa), Interpersonal Relations and Group Processes (JPSPi), and Personality Processes and Individual Differences (JPSPp)*, each with its own separate editorial board.

Since the earliest *Handbooks of Social Psychology,* the selection of chapters has been taken as providing a model of the contents of the field (Gilbert, Fiske, & Lindzey, 1997). In the recently published *APA Handbook of Personality and Social Psychology*, a fourfold model is presented in which the *JPSP* structure is largely preserved, but in which *Group Processes* and *Interpersonal Relations* are now represented in separate volumes (Mikulincer & Shaver, 2014). The structure of the *Handbook* is hierarchical: The four volumes are partitioned into 23 sections and, excluding introductory pieces, 100 chapters. For example, the volume on *Attitudes and Social Cognition* is divided into six parts, the first of which is *Human Nature. Human Nature* is further divided into four chapters, the first of which is *Evolutionary Social Cognition* (Neuberg & Schaller, 2015).

Limits of a hierarchical model. Although the scope of the 100 chapters of the *Handbook* is impressive, and may well provide a representative sampling of research areas in the field, the topics do not appear to be related in a simple hierarchical model. Such a model would predict that topics in different volumes, or in different sections within volumes, should be further apart than chapters in the same volume or section. On at least one metric this does not hold: For

example, the *Evolutionary Social Cognition* chapter shares only one common reference with the chapter, in the same section of the same volume, on *Psychological and Sociomoral Reasoning in Infancy* (*Baillargeon et al, 2015),* but eight references with the chapter, in a different section of a different volume, on *Evolutionary Personality Psychology (Buss & Penke, 2015).*

The inadequacy of a simple hierarchy for describing the relative proximity of chapters in the *Handbook* is not a failure of the editors, but is instead a reflection of the multidimensional structure of social/personality psychology. If the Neuberg and Baillargeon chapters are linked by their concern with cognition, Neuberg and Buss are linked, and linked more strongly, by their common metatheory. A more general network model can provide a better account of the multiple ways in which the elements of personality and social psychology are connected.

Academic areas as networks and communities

Connections among persons, products, and institutions in social/personality psychology may be represented as a network. As scientific knowledge is largely social (we learn not only in direct interactions with others but also from the papers and writings that others produce), this may be considered a *social network.* Historically, social network analysis (SNA) has been closely linked with mainstream social psychology. The fields have common roots in Lewin's (1936) topological and vector psychologies, in applications of graph theory including Heider's (1946) work on balance theory, and in empirical demonstrations such as Milgram's (1967) study of small worlds. Today, SNA remains well suited to understanding the reciprocal impact of person and community, as it has illuminated topics such as the extra-dyadic nature of cooperation (Apicella, Marlowe, Christakis, & Fowler, 2012), contagion in emotional states as well as in

political and health behaviors (Bond et al., 2012; Christakis & Fowler, 2007), and the network structure of social inequality (diPrete & Eitich, 2006; Salgarnik, Dodds, & Watts, 2006).

Scholarly communities and family resemblance. Regardless of how the structure of scientific inquiry is articulated, the membership of entities (ideas, persons, graduate programs) within topical regions (attitudes, psychometrics) of the space is not discrete but graded. The fuzziness of areas of scholarly inquiry has long been recognized (Bensman, 2001). A fuzzy conception allows recognition that some topics may be included in multiple disciplines or possibly none at all (Campbell, 1969). Such a model allows for overlapping categories and a continuum of distances between regions, and can better capture the latent structure of research and scholarly inquiry.

This fuzzy structure implies that communities of scholarship will be defined by family resemblance rather than by a set of individually necessary and jointly sufficient attributes (Rosch, 1975). That is, there are typically no methods, theories, etc. which are shared by and uniquely characteristic of all papers within a particular area of scholarship. Rather, membership in categories is graded, and any exemplar (such as a paper, person, or premise) may belong to more than one category (area of scholarship).

Project overview

In the present studies, I examine the structure of social/personality psychology empirically, initially using a sample of author-selected keywords of papers submitted to two conferences (Study 1) then more extensively using common citations or 'bibliographic couplings' from papers published in four journals (Study 2). In each study, I examine the network structure of social/personality psychology and attempt to partition the field into

discrete areas of study. In addition, in Study 2 I explore a more complex model which allows for communities to overlap. These research communities, in turn, are treated as corpora (bodies of text); I apply differential language analysis to identify or interpret their meaning (Schwartz, Eichstaedt, Kern, Dziurzynski & Ramones et al., 2013).

Study 1: The network structure of SPSP keywords

Articles, grant proposals, and conference submissions typically include one or more keywords which facilitate the identification of papers for, among other things, the selection of reviewers. The co-occurrence of keywords across entities such as papers provides a measure of proximity, and can form the basis of a network model. In the information sciences, for example, Ortega and Aguillo (2012) developed a network model of disciplines and areas of scholarship on the basis of the co-occurrence of keywords in profiles of individuals registered in Google Scholar. In the present study, I explore the structure of social/personality psychology, using keywords which identified submissions to the *Society for Personality and Social Psychology* (*SPSP*) for its annual conventions.

Method

For the 2015 and 2016 *SPSP* annual conventions, all submissions of proposals for symposia and posters were required to include two keywords selected from a list of 43 terms (see Table 2). Using the open-source software package Gephi (version 0.8.2; Bastian, Heymann, & Jacomy, 2009), I constructed an undirected network in which these keywords serve as nodes or vertices. Nodes are connected by an edge when they co-occur in at least one proposal, and the weight of these edges corresponds to the number of co-occurrences of the terms across the set of proposals.

Results

Excluding six submissions in which the keyword "Special session" appeared, there were 4308 proposals (or keyword-pairs), and 43 keywords. Each keyword was used an average of 200 times, with *Stereotyping/Prejudice* (504, 12%), *Close Relationships* (496, 12%), and *Emotion* (483, 11%) each appearing in more than 10% of submissions.

There was little evidence of redundancy in the keyword list. No keyword was directly linked to all others, but *Stereotyping/Prejudice* was directly connected to all but one (*Personality Development*). The most common pairing of keywords was between *Stereotyping/Prejudice* and *Intergroup Relations* (109 co-occurrences). This accounted for 35% of the proposals in *Intergroup Relations*, the single highest co-occurrence percentage across the 43 keywords.

Network structure. In typical complex networks, each node is linked to only a small fraction of the possible nodes, and the distribution of popularity (degree) follows a power function (Barabasi & Albert, 1999). This was not true of the present small, dense network of keywords: The average proposal was directly linked to most others (29.3, 70%); the remaining 30% were separated in the network by only one term.

The network of keywords linked by co-occurrences is shown in the two panels of Figure 1. In the top panel, the entire (unrestricted) network is shown; in the bottom, the network is restricted to only those keywords which were selected 200 or more times, or above the mean for all keywords, and only to co-occurrences or edge weights of 20 or more. Because attempts to partition networks frequently lead to inconsistent results (Lancichinetti & Fortunato, 2012), I repeated a modularization of the networks ten separate times using different seed values. For

the unrestricted network, results were largely consistent, with three modules found in each of ten analyses. For the restricted network, the four communities seen in Figure 1b appeared in seven of ten analyses; in the remaining three analyses, the *Self-Regulation* and *Motivation/Goals* (yellow) cluster was included in the broader (blue) cluster seen in both panels. Of the communities included in both the unrestricted and restricted networks, only one other community (*Person Perception/Impression Formation)* shifted across the two models.

Discussion

The 43 keywords used to identify SPSP submissions may be represented as a network, and this network may be imperfectly partitioned into three or four communities, depending upon whether the *Motivation/Goals* and *Self-Regulation* doublet appears as a separate cluster. Two depictions of this network illustrate (1) the breadth and heterogeneity of the (blue) community led by *Close Relationships* and *Emotion*, (2) the density or depth of the (green) community surrounding the *Stereotype/Prejudice* keyword, and (3) the presence of a smaller (red) community surrounding *Judgment and Decision Making* and *Applied Social*. It also reveals that (4) links between keywords in different groups are frequent, and that this (or perhaps any) discrete partitioning of the keyword network is therefore imperfect.

Given that a three-community model characterizes both the present structure and that of *JPSP,* it is appropriate to examine the correspondence between the two representations. That correspondence is at best uneven (Figure 1, especially panel B). The smallest of the three major communities (red) shows some correspondence with the *JPSPa* section, but could alternatively be labeled as *Applied Social.* The green community corresponds to *Group Processes,* but does not include the core of *Interpersonal Relations,* supporting the partitioning

found in the *APA Handbook (2014)* rather than the composite *JPSPi* section. The largest (blue) region includes not just the core of *Personality Processes and Individual Differences (JPSPp)*, but also *Interpersonal Relations* as well as concepts which span and are represented in all three *JPSP* sections, including *Emotions*.

The place of personality in the keyword network. The nexus of the two keywords *Personality Processes/Traits* and *Individual Differences* corresponds closely with the label of the *JPSPp section.* Connections between these terms and others in the network suggest that the role of "personality" in the keyword network is broad rather than deep. Although a discrete personality community was not found, the keywords *Personality Processes/Traits* or *Individual Differences* were paired with all but one of the remaining keywords (*Disability*) in at least one proposal. Overall, the two keywords appeared in 16% of the proposals, and were disproportionately likely to be paired with *Personality Development* (32%) and *Methods/Statistics (21%).* By way of contrast, the personality keywords appeared in only 3% of the proposals with *Stereotypes/Prejudice,* revealing a decline of interest in the roots of prejudice in personality since early research on, for example, the California F-scale (Adorno, Frenkel-Brunswik, Levinson, & Sanford, 1950). This decline of interest in personality and prejudice is mirrored by an opposing trend for the keyword *Motivation.* A generation ago, a decline of interest in motivation within psychology was apparent (Hilgard, 1987); today, the resurgence of the concept is apparent in its popularity in the present set of keywords (Table 2) as well as in its dense connections with popular concepts including *Self-Regulation, Emotion, and Close Relationships*.

Although this study provides some insight into the structure of social and personality psychology, it suffers from several limitations. One of these is that the keywords describe submissions rather than accepted papers, and may as a consequence disproportionately represent work which is aspirational rather than fully accomplished. Perhaps more importantly, keywords are a problematic measure of the contents of scholarship. Self-reports of expertise are useful but imperfect; authors can be expected to be more attuned to some features of their work than others. Further, even if authors could perfectly identify the contents of their work, labelling these contents is challenging. The seeming arbitrariness of the task is reflected in the keywords used in a sample paper in the *APA online style manual,* which includes, for example, 'emotion' but not 'affect', and 'attention' but not 'detection' (APA, 2015). A dataset consisting of accepted papers and better articulated connections should allow for a more accurate, if more complex, representation of the structure of the field.

Study 2: The structure of published work in major journals in social/personality psychology

In addition to keywords, models of the structure of scholarly communities can be built from a number of sources, ranging from sociological networks to clickstreams of articles viewed by individual scholars on electronic devices (Bollen et al., 2009; Morris & van der veer Martens, 2008). Two approaches are particularly noteworthy: The first, and most important, relies on bibliometric data, in particular, upon analyses of citations. A second approach assesses the similarity of papers based upon the content of whole texts (Green, Feinerer, & Burman, 2013, 2014). In the present study, I combine these bibliometric and whole-text approaches.

Citations. A citation is a type of directed, dyadic act. Within psychology, prior studies have largely focused upon the target rather than the source of this act, as in studies of citation

counts as measures of scholarly productivity (Simonton, 1997). In an ambitious earlier paper in this journal, Quinones-Vidal, Lopez-Garcıa, Penaranda-Ortega, and Tortosa-Gil (2004) employed citation analysis to study productivity in social/personality psychology at the level of persons, papers, and institutions. By examining the characteristics of reference lists over time, they determined that the half-life of papers was increasing rather than decreasing, suggesting that the field as a whole was more characterized by an increasing relevance of history than by an accelerating rate of change. Although they did examine the 'small world' surrounding one author (Wyer), they did not use citations as a building block for a network structure of the discipline.

In the present study, the focus of citation analysis is on the source rather than the target, that is, the act of citing. While the focus on targets (e.g., citation counts) can provide indices of productivity, the focus on the act of citing can be illuminating as well: Witness the recent finding that, across some 1.7 million records in the *JSTOR* database, men cite themselves 56% more frequently than women (King, Correll, Jacquet, Bergstrom, & West, 2015). Here, we use citation analysis to help construct a structural map of the discipline. Links between papers are built on the basis of *bibliographic couplings* (the co-occurrence of a citation in different reference lists), the best validated simple measure of bibliometric proximity (Boyack & Klavans, 2010).

Simple and complex models of community structure. In the analysis of keywords in the prior study, communities were identified by partitioning the entire network space. This 'top-down' approach gives rise to a complete and simple structure in which every observation is associated with one and only one community.

Alternatively, communities may be developed in a 'bottom-up' sequence of agglomerative cluster building. One cluster analytic approach used in network science, the Clique Percolation Method (CPM), begins with finding complete subgroups of a given size (*k-cliques*), then combines adjacent subgroups into communities (Palla, Derenyi, Farkas, & Vicsek, 2005). In contrast to the top-down approach, cluster-based approaches such as the CPM give rise to a structure in which each node may be assigned to several communities, one community, or none at all. Communities identified by this method resemble other forms of cognitive and linguistic categories in that members of communities are characterized by family resemblance rather than necessary or sufficient features (Rosch, 1975). Further, the overlap between communities may be treated as a higher-order network, giving rise to the potential for a hierarchical model. Although interpretatively challenging, a complex approach may better capture the latent structure of social/personality research.

Text analysis and the labelling of communities. One or two-word characterizations of scholarly communities or psychological constructs are inevitably inaccurate, or at the very least elliptical. Because the units of observation in the present analysis are scholarly papers, one approach to better identifying the nature of communities is to empirically compare their textual content. The logic of this approach echoes that of Green and his colleagues in their examination of the structure of the *Psychological Review* in the early 20th Century. Their text-based approach to the history of psychology provides a better articulated understanding of what has traditionally described as the era of psychological schools and systems, illuminating, for example, the relationship between two schools of functionalism and the early emergence of two separate approaches to the study of vision (Green, Feinerer, & Burman, 2013, 2014)

In the present study, text analysis is used not to discover the similarity of papers, but instead to compare and interpret partitions or clusters found using citation analysis. This approach of *differential language analysis* has come to prominence in the exploration of the personality correlates of language use in social media (Schwartz et al., 2013). The method has not, however, been used in conjunction with network and community analysis to empirically identify the structure of scientific disciplines or areas of scholarship.

Method

Data included papers published in 2014 in the four primary journals in social/personality psychology: *JPSP, Personality and Social Psychology Bulletin (PSPB), Personality and Social Psychology Review (PSPR), and Social and Personality Psychology Science (SPPS)*. For this sample of papers, citation data was downloaded as well as the whole text of these papers; the latter was converted to text using ABBYY Finereader (Version 11; ABBYY, 2011).

Of the 375 papers published in the four journals in 2014, 9 were excluded from the network as they were corrigenda, retractions, or editorial comments. Also excluded were 12 papers which appeared in the last 2014 issue of *SPPS* (i.e., issue 8) for which references had not been added to the *PsycInfo* database as of 6/10/15. This left 354 source papers available for analysis, each of which was identified by the last name of the first author and a journal abbreviation. For *JPSP*, this included a section identifier, which I manually added to the APA data. Where an author published more than one paper in the same journal, articles were disambiguated using a sequence letter (a,b,c).

Because of the absence of a universal person-identifier and the presence of many duplicate names, it was frequently not feasible to identify references by authors, hence digital

object identifiers (DOIs) were used. The total number of cited references in these papers was 22,930, including 5155 references (22%) for which no DOI was available; these omitted references are typically books, chapters, and articles appearing in old and/or obscure journals. After removing blank lines, 17,775 edges (links between citing papers and cited references with DOIs) remained. Descriptive statistics for these journals and journal-sections are given in Table 3.

Results

The network was analyzed in a series of broad steps: First, the citation network was explored, then reduced to a single-mode structural network. Second, the community structure of this network was investigated using a simple (partitioning) approach, and the content of these communities was identified and interpreted using text analysis. Third, a complex community structure was investigated, and, as with the simple community structure, was also interpreted using text analysis. Finally, in addition to examining the network at the level of the individual paper, the network of links between journals or, in the case of *JPSP*, journal-sections, was also examined.

From citations to structural network. The citation data were analyzed using the open-source software Gephi to produce a bipartite network of 354 source nodes, 12858 additional cited papers, and 17775 edges linking the two sets. This network consists of a single giant component, but is sparse (i.e., each source paper is directly linked to a very small fraction of the total papers in the database). Treating the network as undirected - that is, effectively thinking of citations as 'is linked to' rather than 'cites' - gives rise to a network with a diameter of 12, and an average path length (e.g., source-target-source) of 5.6. Modularity analyses were not stable;

in ten successive analyses with different random seeds, between 40 and 45 modules were found.

Within Gephi, I used the Multi-Mode Network Projection plug-in (Kuchar, 2013) to reduce the bipartite (*author -> citation <- author*) network to a single-mode (*author <-> author*) network, in which the weight of a link between any two papers reflects the percentage of references common to them. This *structural network* is dense, comprising 8646 links or edges which link the average paper directly to 49 of the 353 remaining papers. The average distance between any two papers is less than 2, and the largest distance is only 5.

Although the citation network is itself not of central interest, it can be noted in passing that the most cited papers are largely methodological: Of the ten papers cited most often in the four major personality and social journals in 2014, seven are concerned with moderator and mediator effects (four papers) or measures and measurement (three). Only three are primarily concerned with deeper issues of psychological theory, including Baumeister and Leary (1995) on the Need to Belong, Markus and Kitayama (1991) on culture and the self, and Murray, Holmes, and Collins (2006) on risk in relationships. Although most of these papers are relatively recent (the median publication year was 2005), three also appeared on Quinones et al's (2006) list of the most cited papers in *JPSP* in the 1990s (see Table 4). These widely-cited papers stand in contrast with the majority of the cited papers in the network, 79% of which (10207/12858) were cited by only one of the source papers under study.

A simple community structure: Partitioning social and personality psychology. As in the analyses of keywords and the bipartite citation network, attempts to partition the structural network led to results which were imperfectly robust. Using Gephi's implementation of the

Louvain algorithm for community detection, with edge weights incorporated and a resolution value set to 1.0 (the default), between seven and ten partitions were retrieved in ten separate analyses. A representative solution, with eight communities, is illustrated in Figure 2; communities are numbered and denoted by the prefix 's' to identify their origin in this simple community analysis. Brief labels for these communities include Personality (s2; comprising 80 papers), Threat and Beliefs (s7; 66), Categorization and Aggression (s5; 46), Ideology and Character (s3; 44), Relationships (s6; 41), Ostracism and Social Pain (s1; 36), Thinking and Reasoning (s4; 28), and Intergroup Anxiety (s0; 13). Particularly for the papers published in *JPSP*, there was some overlap between these categories and the journal sections in which the papers appeared: More than one-half (25/45) of the papers in *JPSPp* are found in the Personality partition, and roughly one-third of the papers in *JPSPi* (14/43) and *JPSPa* (9/30) may be found in Relationships and Thinking and Reasoning, respectively. A list of all community members is provided in a supplement. A deeper examination of these partitions is considered in the differential language analyses below.

Differential language analysis of simple communities. In order to better identify the communities found in this analysis, I used differential language analysis. For each community, the text of all papers was combined into a single corpus (body of text), then compared to a baseline derived from all of the 354 papers under study. The *tm* package in R was used to prepare documents (Feinerer & Hornik, 2015). Punctuation, words of fewer than three characters, and common stop words (e.g., 'the') were excluded from the analysis, as were less relevant terms such as descriptions of the formal structure of papers (e.g., abstract, conclusion), near-universals (behavior, condition, data), and numbers (one, four). In addition,

words were set to lowercase. Word-clouds were then constructed consisting of the terms whose Anscombe-adjusted proportion showed the greatest difference between each corpus and the baseline set of all documents (Schwartz et al., 2013).

Figure 3 includes word clouds which summarize the most differentiating terms for the eight discrete communities found in the partitioning analysis. For each community, the number of terms included in the word cloud corresponds with the number of papers.

The largest community (**Personality**) includes 80 papers which are characterized by the presence of the word *personality* as well as by terms describing key constructs (*extraversion, self-esteem, agreeableness, religiosity, satisfaction, materialism, adjustment*),as well as terms associated with development (*developmental, years, children, life, death, age, child, mothers, childrens, parenting, gain*), and measurement (*domain, measurement, types, traits, differences, model, comparison, average*). Other characteristic terms described the context and structure of personality psychology (*individual, situation, situations, personal, states, culture, goal, values).*

In the second largest community (**Threat/Beliefs**), differentiating terms included language associated with schools (*academic, theories, math, students, providers, test, scheduling*), beliefs about knowledge (*incremental, entity, theory, belief, belief*s), stereotypes (*women, class, stereotype, implicit, sexism, gay, negative*), and the consequences of performance (*threat, negative, self-esteem, bad, good, conflict, performance, lower).* Terms associated with methods include *prime, mediated, mediation, validational, and endorsement.*

A **Categorization/Aggression** community included words associated with groups (*categorization, ingroup, power, outgroup, groups, categories, perceived, perspective-taking),* aggression (*violent, video, game, aggressive, alcohol, aggression*), and prejudice (*prejudice,*

racial, Black, White, race, gay, bias, multiracial, attitudes). Several terms suggest a cognitive or information processing approach in both theory (*awareness, implicit, explicit, memory, processing, evaluative*) and method (*experimental, priming, cues, games, faces*).

The **Ideology and Character** cluster included terms associated with morality, moral emotions, values, and character (*moral, character, disgust, morality, characteristics, self-sacrifice*) as well as the related domains of ideology (*conservative, orientation, liberal, attitudes, conservatives, liberals, ideology, rightwing, free, punishment, attitudes, and perhaps hierarchy*) and self-control (*will, self-regulation, self-control*). Methodological terms associated with self-report measures also appeared here (*factor, scale, and scales*).

Of the 41 terms most associated with the fifth community, nearly all were closely linked with dyadic **Relationships**, particularly romantic ones (e.g., *relationship, attachment, partner, couple, attraction, commitment, physical, close*); several others were negatively-toned (*anxious, anxiety, negativity, guilt*).

An **Ostracism and Social Pain** community is described by language of rejection (*exclusion, ostracism, rejection, need, pain*) by groups (*collective, group, crowd, others, included, belonging, identification*), and negative or low-positive affect (*nostalgia, regret, emotion, depression*).

The community labeled **Thinking and Reasoning** includes terms from the domain of thinking and problem-solving (*thinking, exemplars, automatic, construal, probability, temporal, future, distance, event, events, concrete*) as well as broader issues in cognition (*language, science, nfc [Need for Cognition]*).

Finally, the smallest of the communities, comprising 13 papers and here characterized by 13 terms, includes terms associated with **Intergroup Anxiety**, including *intergroup, outgroup, contact, and anxiety*.

A complex community structure: Overlapping cliques of scholarship. To examine the bottom-up, complex community structure, I used the open-source software C-Finder (Palla et al, 2005). In C-finder, communities are defined as sets in which each member is linked to at least (*k-1*) other members, and in which each link is greater than a threshold *w.* A range of solutions based on these two parameters (*w* and *k*) is considered, and a model is chosen which simultaneously (a) maximizes structure by setting *w* above the point at which community structure is lost (the percolation threshold) while (b) incorporating half or more of the available edges.

In the present analyses, in order to retain as many of the most influential papers in the structural model, edge weights are adjusted by Impact Factor (Garfield, 2005).[1] The solution presented here is one in which each community consists of papers which are linked to at least seven others, with links restricted to the strongest half of those in the network. This leads to 11 communities, which can be simplified to nine by consolidating two pairs of small communities which share more than half of their constituent papers. In this model, 176 papers are placed in one or more interlocking communities of scholarship, including an omnibus group of papers (Social, c2, with 105 papers), a second large but relatively homogeneous cluster (Relationships, c3, 50), and seven additional smaller communities labeled Attitudes/Exclusion (c6, 13), Personality (c4, 12), Social Cognition (c5, 12), Attraction/Mating (c1, 11), Self-Regulation (c7, 8), Interpersonal Perception (c8, 8), and Implicit Attitudes (c0, 8). Although these communities vary

substantially in size, a potential advantage of this approach is that it can reveal not just areas of scholarship but also relations between these areas, as can be seen in Figure 4. In this and subsequent figures, communities are denoted by the prefix 'c' to indicate that they are derived from a complex community analysis.

Some of these relationships between communities suggest coherent themes or higher-order structures. For example, in the interpersonal domain, a large community of scholarship in relationships is found to overlap with two smaller communities of papers in the areas of attraction/mating and interpersonal perception (see Figure 5). One paper – Eastwick et al's (2014) comment on meta-analysis, attractiveness, and relationship satisfaction - lies at the intersection of all three sets or communities. The seven papers which appear in two or more of the three communities all appear in *JPSPi* or in *PSPR*.

Similarly, in Figure 6, Manczak, Zapata-Gietl, and McAdams' (2014) paper on regulatory focus in a multilayered model of personality forms a bridge between communities of scholarship in personality (c4) and self-regulation (c7), while Hsee, Tu, Lu, and Ruan's (2014) paper on aversion to approaching stimuli links the self-regulation and attitudes/exclusion (c6) communities. All but one of the papers in the personality community (c4) are drawn from *JPSPp*; as one moves across the loosely connected communities in the figure, the number of papers in *JPSPa* in the communities increases, and predominates in the social cognition community (c5).

Finally, in Figure 7, a community of papers on implicit attitude measurement (c0) is linked to the broader main of social psychology (c2) by only a single paper, i.e., Morris, Goldenberg, and Heflick's (2014) paper on self-objectification.

Differential language analysis of complex communities. Word clouds illustrating the terms characteristic of the complex communities are given in the bottom panels of Figures 5-7. These were derived using the same method as in the prior analysis, with two exceptions: terms are restricted only to those which appear in at least four or more papers, and the number of terms in the word clouds is here proportional to the square root of community size.[2]

In the interpersonal domain (Figure 5), the **Relationships** community is characterized by terms similar to those in the prior analysis. It is accompanied by smaller communities of terms associated with, on the one hand, **Attraction/Mating**, and, on the other, with terms such as *targets, perceivers,* and *partners* suggesting a core of dyadic **Interpersonal Perception**.

Distinguishing text in the **Personality** community (Figure 6) reflects the core of the corresponding community extracted in the prior analysis; it includes not just *personality* and *traits* but the most common labels for all five factors. Unlike in the prior analysis of simple communities, it does not include language descriptive of personality development. The present **Self-regulation** community is also more narrow than its closest parallel in the initial analysis (community s3), as the characteristic terms do not include words descriptive of ideology or moral beliefs. The **Attitudes/Exclusion** community is marked by terms such as *attitude, belief, others, social, exclusion,* and *excluded;* it shows some resemblance with the Ostracism and Intergroup Anxiety communities in the prior analysis. The community at the bottom of this figure includes 15 papers marked by heterogeneous language describing motivation (*will, purpose, power*), academics (*school, academic, students*), and the self (*identity, individual, collective*). Constituent papers in the area address topics such as social inference (Haga et al., Yeager), generosity and altruism (Barasch, Jung et al), and nostalgia as a collective

sentiment (Wildschut). Although several papers on improving the quality of research also appear in this community, the majority were more clearly tied to **Social Cognition**.

The terms associated with the remaining small community are almost universally associated with the measurement of **Implicit Attitudes** (*iat, implicit)*, characteristics studied using this approach (*racial, black, white)*, and the processes held to underlie this *(categorization, prejudice, attitudes)*. Finally, the largest community includes broad descriptors of core psychological processes (*motivation, emotion, feel, perception, moral, and empathy*), often with a strong evaluative tone (*trust, pain, threat, negative, positive, failure, bad*), and occasionally directed or dynamic (*future, versus, will, toward*); the breadth and size of this community suggests that no narrower a term than **Social** appears accurate.

Relationships between journals and journal-sections. In addition to examining the empirical community structure of the network at the level of the individual paper, I also examined relationships between papers in the different journals or, in the case of *JPSP*, journal-sections. Relations between the journals (or journal-sections) and the effect of taking into account Impact Factor are shown in Figure 8.

As is illustrated by the varying thicknesses of the edges in the figure, although all six journals are directly connected to each other, the weight of these links varies. *JPSPi* is central, both in its location in the network and in its node size, which reflects weighted degree or the average connectedness between papers in this section and all of those in the network. The loops surrounding each node reveal that the *JPSPi* and *JPSPa* sections are relatively homogeneous, or that papers in these journal-sections have a high tendency to cite other papers in the same section. Of the three *JPSP* sections, *JPSPp* is a relative outlier, as connections

between it and all of the remaining journals and journal-sections are relatively tenuous. Incorporating Impact Factor (panel 2) leads to a drop in the centrality of *PSPB* and *SPPS* and an increase for *PSPR*, but does not alter the relationship between or properties of the three *JPSP* sections.

Discussion

Scholarship in the major journals of social/personality psychology in 2014 may be represented as a small world in which all papers can be connected, either directly or indirectly, by common citations. The density of these connections varies across this network, and communities of scholarship may be isolated within it. Yet this community structure is not well-ordered, reflecting the structure of a field which is connected not just by diverse metatheoretical premises, topics, study populations, methods, and traditions, but also by a multilayered fabric of human bonds. Each citation is an interpersonal as well as a scholarly act.

By examining this community structure using multiple methods (top-down and bottom-up approaches) and levels of analysis (words, papers and journals), several features become apparent.

Personality is the largest community in the simple model, with 80 papers, but is among the smallest in the complex analysis, with only 12. The discrepancy arises, in part, because the complex analysis is restricted only to strongly connected papers, and papers in personality are less well connected than those in other areas. Only 31/80 (39%) papers in the personality community in the initial analysis appear anywhere in the complex model, while 145/274 (53%) of the papers in the other communities are retained (see Supplementary Materials). The lower connectedness, or greater heterogeneity, of papers in personality is also reflected in a lower

weight for the self-loop in the journal analysis (i.e., the proportion of within-journal citations) for *JPSPp* than for the other two *JPSP* sections (see Figure 8). Considering the two sets of analyses together, personality research in 2014 appears as a well-defined or much cited core (the five-factor model apparent in the word-cloud in Figure 6) which is framed both by additional traits or constructs (*adjustment, empathy, religiosity)* and higher-order and metatheoretical concepts (*comparison, development, health, individual, situation).* Core papers in personality overlap with those in relationships and to a small cluster of papers on Self-regulation (c7), but in 2014 were empirically distant from areas such as attitudes and political ideology.

Interpersonal relations are central not just to the meaning of social/personality psychology, and not just to the physical arrangement of *JPSP* sections, but also to the structure of scholarship in the field in 2014 (Figures 4, 5, and 8). Differential language analyses of both the simple (s6) and complex community structures reveal that dyadic romantic relationships lie at the core of this scholarship in this area. The interpersonal domain includes a large number of papers distinguished by warmth and quotidian comfort (c3; *satisfaction, close, attachment*) and a smaller area which appears more emotionally fraught (c1; *anxiety* and *pain* as well as *romantic, attraction, mate, and physical*); these communities roughly reflect the evolutionary imperatives of companionship and sex, respectively. The distinguishing papers in the third community in this area appear to deal with aspects of interpersonal behavior outside of the sphere or spheres of love and sex, including interpersonal perception (c8; Campbell, Leising, and Leith).

Group processes. Ostracism and Social Pain (s1) appears as a bridge between the interpersonal and group domains: The papers in this community overlap with those in relationships (c3), but in the language analysis it is distinguished by terms expressly associated with groups (e.g., *group, collective, others, belonging*). Similar terms characterize two other communities, Intergroup Anxiety (s0) and Categorization/Aggression (s5; see Figure 3). Like the personality area, group processes is well-represented only in the simple analysis and not in the complex analysis. Only one of the thirteen papers in Intergroup Anxiety and 12 of the 46 in Categorization/Aggression were retained in the more restricted model.

Attitudes. In the simple analysis, attitudes appear subsumed by or divided across broader themes including Ideology/Character (s3) and Categorization/Aggression (s5), and do not form a single distinct cluster. In the complex analysis, two small and dense clusters emerge, one characterized by social exclusion (c6), and a second by implicit measurement. This last community, implicit attitudes (c0), is the most isolated community in the complex analysis, overlapping only with a single paper in the large social community. In contrast to group processes, which appears broad but thinly connected, the study of attitudes in 2014 consists of several narrow and densely connected themes.

Social cognition. In the simple community analysis, scholarship in social cognition appears to be represented in three communities in the lower left quadrant of the network, Threat/Beliefs, Thinking/Reasoning, and Ideology/Character (s7, s4, and s3; Figures 2 and 3). Most of the papers in these three communities appear in the broad and relatively undifferentiated Social community (c2) in the complex analysis. This latter community includes content outside of social cognition as well, as is revealed both by the diversity of associated

terms (Figure 7) and by the origins of the papers. In this community, papers in *JPSPi (*17 papers) and *JPSPa* (19) were nearly as well represented as *JPSPa* (21; See Supplementary Materials). Research in social cognition appears as part but not the whole of the broad social community c2. In the complex analysis, this area is more clearly represented in the papers in the eponymous Social Cognition community (c5).

General Discussion

There is no single institutional norm which describes the structure of and relationship between social and personality psychologies. In graduate programs, the field exists as one or two areas; in publications, social/personality may be represented as three or more separate fields. These different models may carry distinct implications for the structure of training and curricula, for the staffing of representative departments, for the accurate identification of individual scholars as potential editors, reviewers, teachers, or collaborators, for the allocation of resources from journal pages to research dollars, and for the way we describe ourselves. Yet despite these consequences, the structure of social/personality psychology has been informed by anecdote, convenience and tradition rather than empirical data.

In recent years, new methods and new datasets have been developed for assessing and visualizing the structure of science, particularly in biomedicine and engineering (Borner et al., 2012). A key finding of these empirical approaches has been that scientific communities cannot be accurately represented by a simple hierarchy of nested units, such as disciplines and subdisciplines, or colleges, departments, and individual labs. Rather, a multiply connected model or network is needed to provide a more accurate representation of the structure of research and scholarship.

In the present paper, the network structure of social and personality psychology has been examined in two studies. In the first, author-assigned descriptors of submissions to two conferences of the Society of Personality and Social Psychology (SPSP) were used. Nodes in this network were individual keywords, and edges were papers which include a given keyword-pair. Communities were identified by a top-down partitioning or modularizing of the network. In the second study, a more curated set of sources was examined (i.e., accepted papers), and the network which binds them was richer (multiple citations rather than a simple pair of self-reported keywords). Papers from the four most prominent journals in social/personality psychology served as nodes, and edge weights corresponded to the proportion of references shared by a given pair of papers. The community structure of this network was examined using both top-down and bottom-up approaches. For each of these, individual communities were interpreted using differential language analysis.

In the first study, relationships appeared together with personality, emotion, and other terms in a single large community. In the second study, a more articulated picture of interpersonal relations was seen. This was centered on dyadic relationships, particularly the role of attachment. This central theme was accompanied in the complex analysis by two communities characterized as attraction/mating and interpersonal perception, respectively (Figure 5). In the simple analysis, the community described by Ostracism and Social Pain also appears on the periphery of both interpersonal relations and group processes.

Group processes appeared as a distinct and coherent community in the keyword analysis, and was represented in several communities in the analysis of simple communities. In the restricted model, group processes was not particularly well represented. Here, few papers

share a large proportion of their citations; the community of scholarship in group processes is, in contrast with interpersonal relations, broad but not tightly knit.

In the keyword analysis (Study 1), attitudes appeared together with social cognition. In the community analysis (Study 2), research into attitudes was seen to be differentiated: In the initial analysis of simple communities, the area of attitudes was split into two communities defined by content, with political attitudes in one area (ideology/character), and racial attitudes in another (categorization/aggression). In the complex analysis, two communities of scholarship in attitudes again appeared, but were distinguished on methodological grounds into implicit and direct approaches. Social cognition was also multiply represented in the simple community model, reflected in distinct communities of scholarship including thinking/reasoning, threat/beliefs, and ideology/character; in the complex model, its role appeared more diffuse, represented both in a cluster of papers concerned with academics, identity, and will (c5) and in the still-broader core area (c2). The diversity or heterogeneity of research in attitudes and social cognition is consistent with the continuing importance of "microtheories" in this area of social psychology.

The structure of the personality community resembled that of the interpersonal domain in that it consisted of a well-defined center coupled with a broader periphery. The core of personality research is measurement, particularly the five-factor model. Beyond that core, an empirical summary of peripheral topics is provided by the contents of the word cloud in Figure 3: Themes include personality development, higher-order constructs such as well-being and satisfaction, and still more abstract or metatheoretical terms such as *goals*, *theory*, *culture*, *positive*, *value*, and *situation.*

Personality resembles the structure of group processes in that it is broad but not tightly knit, well represented in the simple community structure and largely absent in the more restricted analysis. As with these other areas, there is relatively little overlap in the citations of papers in the personality community. Yet unlike group processes, papers in personality are relatively distant from social/personality as a whole; this holds both for the relationship between sections of *JPSP* (Figure 8) and for the relations between communities in the complex community structure (Figure 4). In 2014, personality research was both amorphous, or loosely connected internally, and separate, or relatively disconnected from social/personality psychology as a whole.

On empirical vs. conceptual models of social-personality psychology

A central theme, arguably *the* central theme, in 20th Century psychology was the repeated triumph of empiricism over subjectivity – as seen, for example, in the demise of introspectionism, in the widespread application of IQ testing, and in the consistent superiority of statistical over clinical judgment. Today, with the increasing availability of new data sets and new tools for their study, it seems appropriate that empiricism be applied reflexively to articulate a network structure of the field that is grounded in data rather than anecdote and tradition.

The present paper is an initial step towards that goal. Empirical methods of network and cluster analysis have been used to extract a structure of the field grounded in several datasets; in addition, the empirical approach of differential text analysis has been used to help identify communities within that structure. These methods have revealed that social/personality psychology is broad, that traditional umbrellas such as ‘attitudes’ may not map on to

contemporary communities of scholarship, that the study of close relationships is central in the field, that research in social cognition is multifaceted, and that personality psychology is simultaneously connected to nearly all areas of social psychological inquiry, and at the same time, lies on its periphery.

Ultimately, it can be expected that an empirical approach to the structure of the field will go much farther. Such an approach could, for example, reveal a non-arbitrary set of core research topics, uncover the nature of (methodological and conceptual) interrelationships between these areas, and indicate which topics bridge or link other topics. Because this would be a network of persons as well as concepts, it could also help researchers identify potential new collaborators. Because each paper is described by the affiliations of authors, such a network could finally provide a conceptual map of academic programs in the field, which could inform stakeholders ranging from funding agencies to potential graduate students about institutions which might otherwise be overlooked.

Yet there are also limits to empiricism. One limitation is that with Big Data comes a need for Big Data reduction: There are multiple methods available for summarizing and visualize large data structures, and the choice of methods is inherently subjective (Silberzahn & Uhlmann, 2015). A more abstract concern is that an empirical approach, considered alone, can take one no further than providing an idealized version of the status quo (Hume, 1739). What social/personality psychology *is* is not necessarily what it should be.

References

Abbyy (2011). ABBYY FineReader 11 Professional Edition for Education [Computer software]. ABBYY Software Ltd.

Adorno, T. W., Frenkel-Brunswik, E., Levinson, D. J., & Sanford, R. N. (1950). *The authoritarian personality.* New York: Harper and Row.

APA (2015). *Sample paper.* Retrieved from http://www.apastyle.org/manual/related/sample-experiment-paper-1.pdf.

Apicella, C. L., Marlowe, F. W., Christakis, N. A., & Fowler, J. H. (2012). Social networks and cooperation in hunter gatherers. *Nature,* 481, 497–501.

Baillargeon, R., Scott, R. M., He, Z., Sloane, S., Setoh, P., Jin, K., Wu, D., & Bian, L. (2015). Psychological and sociomoral reasoning in infancy. In M. Mikulincer, P. R. Shaver (Eds.), E. Borgida, & J. A. Bargh (Assoc. Eds.), *APA handbook of personality and social psychology: Vol. 1. Attitudes and social cognition* (pp. 79-150). Washington, DC: American Psychological Association.

Barabasi, A.L. & Albert, R. (1999). Emergence of scaling in random networks. *Science, 5439,* 509-12.

Bastian M., Heymann S., Jacomy M. (2009). Gephi: an open source software for exploring and manipulating networks. [Computer software]. *International AAAI Conference on Weblogs and Social Media.*

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117(3)*, 497-529.

Bollen J, Van de Sompel H, Hagberg A, Bettencourt L, Chute R, Rodriguez MA, et al. (2009) Clickstream Data Yields High-Resolution Maps of Science. *PLoS ONE 4(3): e4803.* doi:10.1371/journal.pone.0004803

Bond, R. M., Fariss, C. J., Jones, J. J., Kramer, A. D. I., Marlow, C., Settle, J. E., & Fowler, J. H. (2012). A 61-million-person experiment in social influence and political mobilization. *Nature*, *489(7415)*, 295–298. Retrieved from http://dx.doi.org/10.1038/nature11421

Borner, K., Klavans, R., Patek, M., Zoss, A.M., Biberstine, J.R., Light, R., Larivière, V. & Boyack, K. W.. (2012) Design and Update of a Classification System: The UCSD Map of Science. PLoS ONE 7(7): e39464. doi:10.1371/journal.pone.0039464

Boyack, K. W., & Klavans, R. (2010). Co-citation analysis, bibliographic coupling, and direct citation: Which citation approach represents the research front most accurately? *Journal of the American Society for Information Science and Technology, 61(12*), 2389–2404.

Buss, D. M., & Penke, L. (2015) Evolutionary Personality Psychology. In M. Mikulincer, P. R. Shaver (Eds.), L. Cooper & R. Larsen (Assoc. Eds.): *APA handbook of personality and social psychology: Vol. 4. Personality Processes and individual differences* (pp. 79-150). Washington, DC: American Psychological Association.

Campbell, D. T. (1969). The ethnocentrism of disciplines and the fish-scale model of omniscience. In M. Sherif and C.W. Sherif, eds., *Interdisciplinary relationships in the social sciences.* P. 328- 348. Hawthorne, NY: Aldine.

Christakis, N. A., & Fowler, J. H. (2007) The Spread of Obesity in a Large Social Network over 32 Years. *New England Journal of Medicine, 357*:370-379. doi: 10.1056/NEJMsa066082

Cronbach, L. J. (1957). The two disciplines of scientific psychology. *American Psychologist, 12*, 671-684.

DiPrete, T. A., & Eirich, G. M. (2006). Cumulative Advantage as a Mechanism for Inequality: A Review of Theoretical and Empirical Developments. *Annual Review of Sociology, 32,* 271-297.

Eastwick, P. W., Neff, L. A., Finkel, E. J., Luchies, L. B., & Hunt, L. L. (2014). Is a meta-analysis a foundation, or just another brick? Comment on Meltzer, McNulty, Jackson, and Karney (2014). *Journal of Personality and Social Psychology*. http://doi.org/10.1037/a0034767

Feinerer, I., & Hornik, K. (2015) *tm: Text mining package (R package version 0.6-2).* [Computer software]. Downloaded from http://CRAN.R-project.org/package=tm.

Garfield, E. (2005) The Agony and the Ecstasy—The History and Meaning of the Journal Impact Factor Impact factor. Paper presented at the International Congress on Peer Review And Biomedical Publication. Downloaded from http://garfield.library.upenn.edu/papers/jifchicago2005.pdf.

Gilbert, D., Fiske, S., & Lindsey, G. (Eds.), *Handbook of social psychology*. Boston: McGraw-Hill.

Green, C. D., Feinerer, I., & J. T. Burman. (2013). Beyond the schools of psychology 1: Digital analysis of *Psychological Review*, 1894-1903. *Journal of the History of the Behavioral Sciences, 49*, 167-189.

Green, C. D., Feinerer, I., & Burman, J. T. (2014). Beyond the schools of psychology 2: Digital analysis of *Psychological Review*, 1904-1923. *Journal of the History of the Behavioral Sciences, 50*, 249-279.

Heider, F. (1946). Attitudes and cognitive organization. Journal of Psychology: Interdisciplinary and Applied, 21, 107–112. doi:10.1080/ 00223980.1946.9917275

Hilgard E.R. (1987). *Psychology in America: a historical survey*. San Diego: Harcourt Brace Jovanovich

Hsee, C. K., Tu, Y., Lu, Z. Y., & Ruan, B. (2014). Approach aversion: Negative hedonic reactions toward approaching stimuli. Journal of Personality and Social Psychology. http://doi.org/10.1037/a0036332

Hume, D. *(1739). A Treatise of Human Nature. London: John Noon.*

John, O. P., Goldberg, L. R. and Angleitner, A. (1984). 'Better than the alphabet: Taxonomies of personality-descriptive terms in English, Dutch, and German'. In: Bonarius, H. C. J., Van Heck, G. L.M. and Smid, N. G. (Eds), Personality Psychology in Europe: Theoretical and Empirical Developments, Vol. 1, pp. 83-100, Swets & Zeitlinger, Lisse .

John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy: History, measurement, and conceptual issues. (O. P. John, R. W. Robins, & L. A. Pervin, Eds.) *Handbook of Personality: Theory and Research (3rd Ed.).* New York, NY, US: Guilford Press.

Kelley, T. A. (1927). *Interpretation of educational measurements.* Yonkers-on-Hudson: World.

King, M.M., Correll, S. J., Jacquet, J., Bergstrom, C. T., & West, J. D. (2015). *Gender and self-citation across fields and over time.* Working paper downloaded 8/6/2015 from http://www.eigenfactor.org/gender/self-citation/SelfCitation.pdf.

Kuchar, J. (2013). Multimode networks transformation, Gephi version 0.8.2 [computer software]. Downloaded from https://github.com/jaroslav-kuchar/Multimode-Networks.

Lancichinetti, A., & Fortunato, S. (2012). Consensus clustering in complex networks. *Scientific Reports 2, 336* (arXiv:1203.6093, doi: 10.1038/srep00336).

Lewin, K. (1936). *Principles of topological psychology.* NY: McGrawHill.

Manczak, E. M., Zapata-Gietl, C., & McAdams, D. P. (2014). Regulatory focus in the life story: Prevention and promotion as expressed in three layers of personality. *Journal of Personality and Social Psychology.* http://doi.org/10.1037/a0034951

Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review, 98(*2), 224-253.

McGuire, W. J., McGuire, C. V., Child, P., & Fujioka, T. (1978). Salience of ethnicity in the spontaneous self-concept as a function of one's ethnic distinctiveness in the social environment. *Journal of Personality and Social Psychology, 36*, 511-520.

Mikulincer, M., & Shaver, P. R. (2014). *APA Handbook of Personality and Social Psychology.* Washington: APA,

Milgram, S. (1967). The small world problem. *Psychology Today, 2*, 60–67.

Morris, K. L., Goldenberg, J. L., & Heflick, N. A. (2014). Trio of terror (pregnancy, menstruation, and breastfeeding): An existential function of literal self-objectification among women. *Journal of Personality and Social Psychology.* http://doi.org/10.1037/a0036493

Morris, S. A. and Van der Veer Martens, B. (2008). Mapping research specialties. *Ann. Rev. Info. Sci. Tech., 42*: 213–295. doi: 10.1002/aris.2008.1440420113

Neuberg, S. L., & Schaller, M. (2015). Evolutionary Social Cognition. In M. Mikulincer, P. R. Shaver (Eds.), E. Borgida, & J. A. Bargh (Assoc. Eds.), *APA handbook of personality and*

social psychology: Vol. 1. Attitudes and social cognition (pp.). Washington, DC: American Psychological Association.

Nosek, B. A., Graham, J., Lindner, N. M., Kesebir, S., Hawkins, C. B., Hahn, C., Schmidt, K., Motyl, M., Joy-Gaba, J., Frazier, R., & Tenney, E. R. (2010). Cumulative and Career-Stage Citation Impact of Social-Personality Psychology Programs and Their Members. *Personality and Social Psychology Bulletin, 36,* 1283 –1300.

Ortega, J. L., & Aguillo, I. F. (2012). Science is all in the eye of the beholder: keyword maps in Google Scholar Citations, *Journal of the American Society for Information Science and Technology, 63*(12): 2370-2377

Palla, G., Derenyi, I., Farkas, I., & Vicsek, T. (2005) "Uncovering the overlapping community structure of complex networks in nature and society." *Nature 435*, 814-818.

Quinones-Vidal, E., Lopez-Garcia, J. J., Penaranda-Ortega, & Tortosa-Gil, F. (2004). The nature of social and personality psychology as reflected in *JPSP*, 1965-2000. *Journal of Personality and Social Psychology, 86*, 435-452.

Rosch, E. (1975). Cognitive representations of Semantic Categories. *Journal of Experimental Psychology: General, 104* (3), 192–233.

Salgarnik, M. J., Dodds, P. S., & Watts, D. J. (2006). Experimental Study of Inequality and Unpredictability in an Artificial Cultural Market. *Science*, 311, 854-856.

Schwartz HA, Eichstaedt JC, Kern ML, Dziurzynski L, Ramones SM, et al. (2013) Personality, Gender, and Age in the Language of Social Media: The OpenVocabulary Approach. PLoS ONE 8(9): e73791. doi:10.1371/journal.pone.0073791

Silberzahn, R., & Uhlmann, E. L. (2015). Crowdsourced research: Many hands make tight work. *Nature, 526(7572):*189-91.

Simonton,D. K. (1997). Creative Productivity: A Predictive and Explanatory Model of Career Trajectories and Landmarks Psychological Review 1997, Vol. 104, No. 1, 66-89

Social Psychology Network (2015). Ranking of U.S. Psychology Ph.D. Programs by Area. https://www.socialpsychology.org/ggradoth.htm

Swann, W.B., Jr. & Seyle, C. (2005). Personality psychology's comeback and its emerging symbiosis with social psychology. *Personality and Social Psychology Bulletin, 31,* 155-165.

Tracy, J. L., Robins, R. W., & Sherman, J. W. (2009). The practice of psychological science: Searching for Cronbach's two streams in social-personality psychology. *Journal of Personality and Social Psychology*, *96*, 1206-1225.

Notes

[1] To adjust link weight for the number of cited papers, I divided the number of shared references by the square root of the product of the number of references in each paper, providing an index of the percentage of common references. To weigh links by node importance, I computed the product of the Impact Factors of the two linked journals. In the complex community analysis, weights were taken as the sum of the standardized values for these two measures of link strength and node importance, re-expressed as deciles to avoid negative weights.

[2] These additional steps were necessary because of the size and variability in size of these communities in comparison with those in the prior analysis.

Table 1

Graduate programs in social and/or personality psychology, 2015

Program type/label	University
Social and personality in two separate areas (4 programs)	Northwestern , Michigan, Minnesota-Twin Cities, Western Ontario
One program which includes "social" and "personality" (22)	Columbia , Cornell , Michigan State , Northeastern, Princeton, British Columbia, California-Berkeley, California-Davis, California-Irvine, California-Riverside, Illinois-Urbana-Champaign, Missouri, Oregon, Rochester, Texas-Austin, Washington, Wisconsin-Madison, Washington U, Yale, Carnegie Mellon, Toronto
One program in "social" without "personality" (32)	Arizona State, Duke, Florida State, Harvard , Indiana-Bloomington, Iowa State, New York , Ohio State , Pennsylvania State, Purdue , Rutgers, Simon Fraser , Stanford, Texas A&M, California-Los Angeles, California-Santa Barbara, Chicago, Colorado-Boulder, Connecticut, Florida, Iowa, Kansas, Massachusetts-Amherst, North Carolina-Chapel Hill, Southern California, Utah, Virginia, Waterloo, Claremont Graduate U, Stony Brook, Maryland, Pennsylvania

Sources: Programs are those identified in Nosek et al (2010) as impactful and/or ranked by Princeton Review's Gourman Report in social or personality psychology (Social Psychology Network, 2015). Program labels were extracted from individual university websites on 7/15/2015. Program labels may include other areas (e.g., "health" in addition to social and/or personality).

Table 2

SPSP keywords, by frequency of endorsement and network community

	Frequency		
Keyword	Count	%	Community[a]
Close Relationships	496	11.5%	Blue
Emotion	483	11.2	Blue
Motivation/Goals	393	9.1	Blue/Yellow
Person Perception/Impression Formation	379	8.8	Blue/Green
Self/Identity	376	8.7	Blue
Individual Differences	373	8.7	Blue
Personality Processes/Traits	352	8.2	Blue
Culture	313	7.3	Blue
Mental Health/Well-Being	286	6.6	Blue
Other	240	5.6	Blue
Self-Regulation	230	5.3	Blue/Yellow
Prosocial Behavior	191	4.4	Blue
Norms and Social Influence	177	4.1	Blue
Belonging/Rejection	166	3.9	Blue
Aggression/Anti-Social Behavior	110	2.6	Blue
Methods/Statistics	102	2.4	Blue

(table continues)

Table 2 (continued)

SPSP keywords, by frequency of endorsement and network community

	Frequency		
Keyword	Count	%	Community[a]
Self-Esteem	101	2.3	Blue
Social Neuroscience	95	2.2	Blue
Evolution	81	1.9	Blue
Field Research/Interventions	77	1.8	Blue
Psychophysiology/Genetics	62	1.4	Blue
Lifespan Development	52	1.2	Blue
Social Development	36	0.8	Blue
Personality Development	34	0.8	Blue
Meta-Analysis	26	0.6	Blue
Disability	9	0.2	Blue
Stereotyping/Prejudice	504	11.7	Green
Intergroup Relations	315	7.3	Green
Gender	270	6.3	Green
Groups/Intragroup Processes	234	5.4	Green
Politics	119	2.8	Green
Diversity	89	2.1	Green
Social Justice	75	1.7	Green

(table continues)

Table 2 (continued)

SPSP keywords, by frequency of endorsement and network community

	Frequency		
Keyword	Count	%	Community[a]
Judgment/Decision-Making	364	8.4	Red
Applied Social Psychology	312	7.2	Red
Attitudes/Persuasion	303	7.0	Red
Morality	212	4.9	Red
Physical Health	169	3.9	Red
Organizational Behavior	112	2.6	Red
Religion/Spirituality	102	2.4	Red
Nonverbal Behavior	82	1.9	Red
Language	53	1.2	Red
Law	43	1.0	Red

Notes: N proposals = 4308. Duplicate keywords (e.g., *Other, Other)* were supplied for 18 proposals. Keywords shown in bold are central terms included in the restricted as well as the unrestricted networks.

[a]Community refers to the regions in Figure 1(a) and, where appropriate, 1(b).

Table 3

Descriptive statistics for citation analyses

Journal/section		Descriptive statistics for citation network (Figures 2-7)			Centrality in journal network (Figure 8)	
Label	Impact factor	Npapers	Mean references/paper	SD references/paper	Weighted	Page rank
JPSPa	5.03	30	77.63	28.92	2.31	18.86
JPSPi	5.03	43	78.67	26.82	2.67	21.35
JPSPp	5.03	45	95.82	47.79	1.75	15.01
PSPB	2.91	116	50.66	16.49	2.04	16.97
PSPR	6.69	20	151.90	80.24	1.34	12.01
SPPS	2.56	100	39.91	12.80	1.88	15.79

Table 4

Most cited papers in four major personality/social journals in 2014.

Authors	Topic	Journal	Cites
Preacher & Hayes (2008)	Moderation and mediation	*Behavior Research Methods*	54
Buhrmeister et al (2011)	Mturk	*Perspectives on Psychological Science*	39
Baumeister & Leary (1995)	need to belong	*Psychological Bulletin*	31
Preacher & Hayes (2004)	Moderation and mediation	*Behavior Research Methods*	25
Watson et al (1988)	PANAS	*Journal of Personality and Social Psychology*	21[a]
Markus & Kitayama (1991)	Culture and self	*Psychological Review*	20[a]
Preacher et al (2007)	Moderation and mediation	*Behavior Research Methods*	18
Oppenheimer et al (2009)	Manipulation checks	*Journal of Experimental Social Psychology*	16
Baron & Kenny (1986)	Moderation and mediation	*Journal of Personality and Social Psychology*	16[a]
Murray et al (2006)	Risk in relationships	*Psychological Bulletin*	15

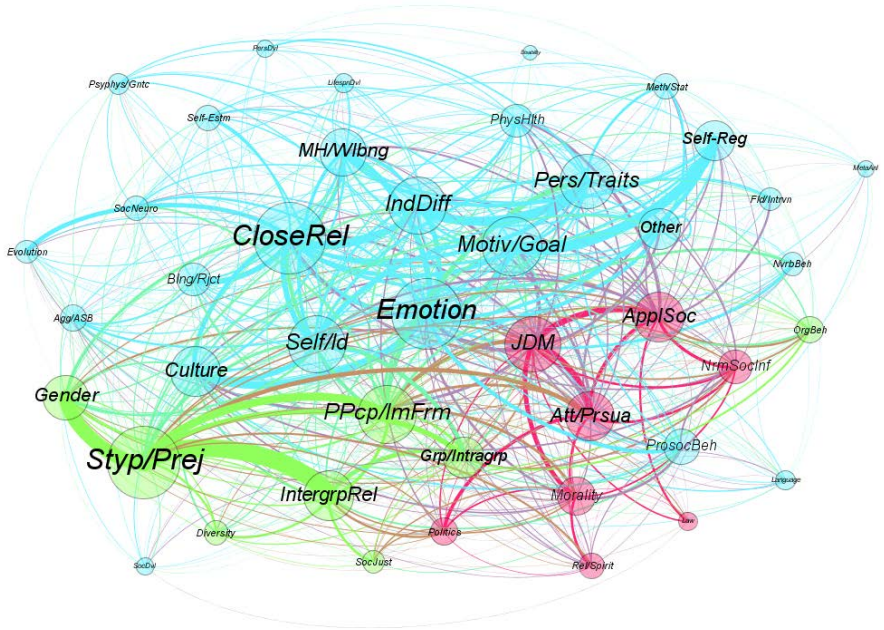
_____

[a]Paper was also listed among the most cited in JPSP in 1990-2000 (Quinones et al, 2004).

Figure 1

Network of keywords in SPSP proposals. Tag and node size corresponds to number of endorsements. Node color corresponds to community; edge color reflects a blend of the keyword pair. (a) Including all keywords. (b) restricted to frequently chosen keywords and common links (minimum degree = 200, minimum edge weight = 20). A color image is available in the online version of this article.

(a)



(b)

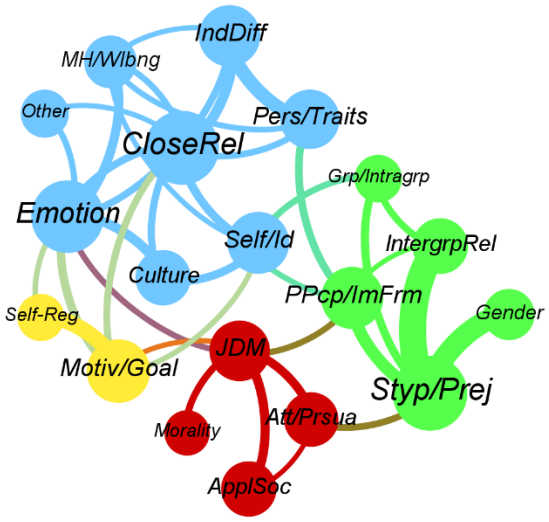


Figure 2

Discrete communities (partitions) of scholarship in major journals in social/personality psychology in 2014. Network includes only the five papers with the highest weighted degree in each community. Links reflect common references. Inset: Network of all papers. A color image is available in the online version of this article.

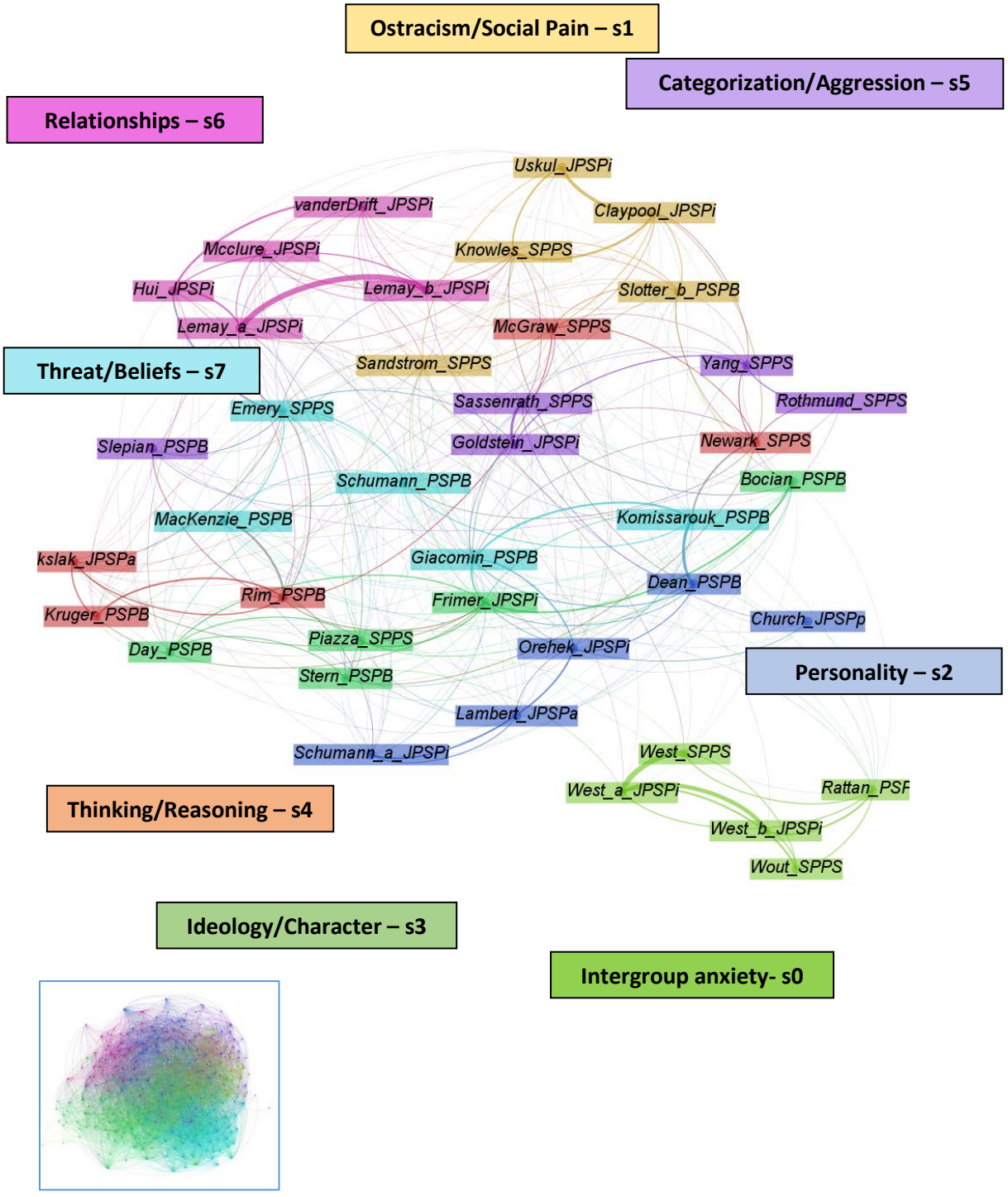


Figure 3

Word clouds showing terms which are most characteristic of discrete communities of scholarship in social-personality psychology. Numbers refer both to the number of papers in each community and the number of words retained in each cloud. A color image is available in the online version of this article.

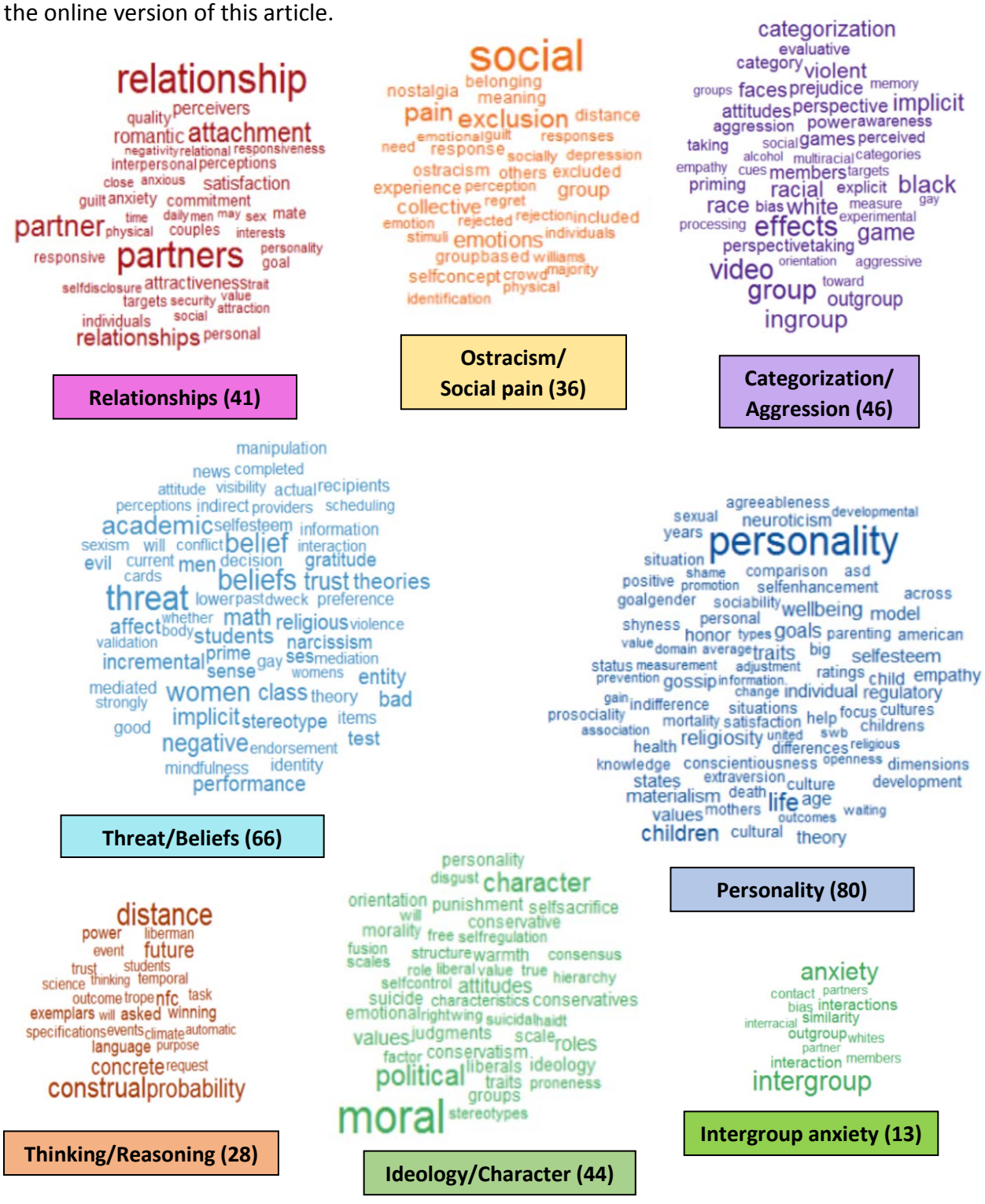


Figure 4

A complex structure of scholarship in social/personality psychology: Relations among all communities. Node size is proportional to number of papers, edge thickness to size of overlap between communities. Community numbers (c2) are for identification purposes only. A color image is available in the online version of this article.

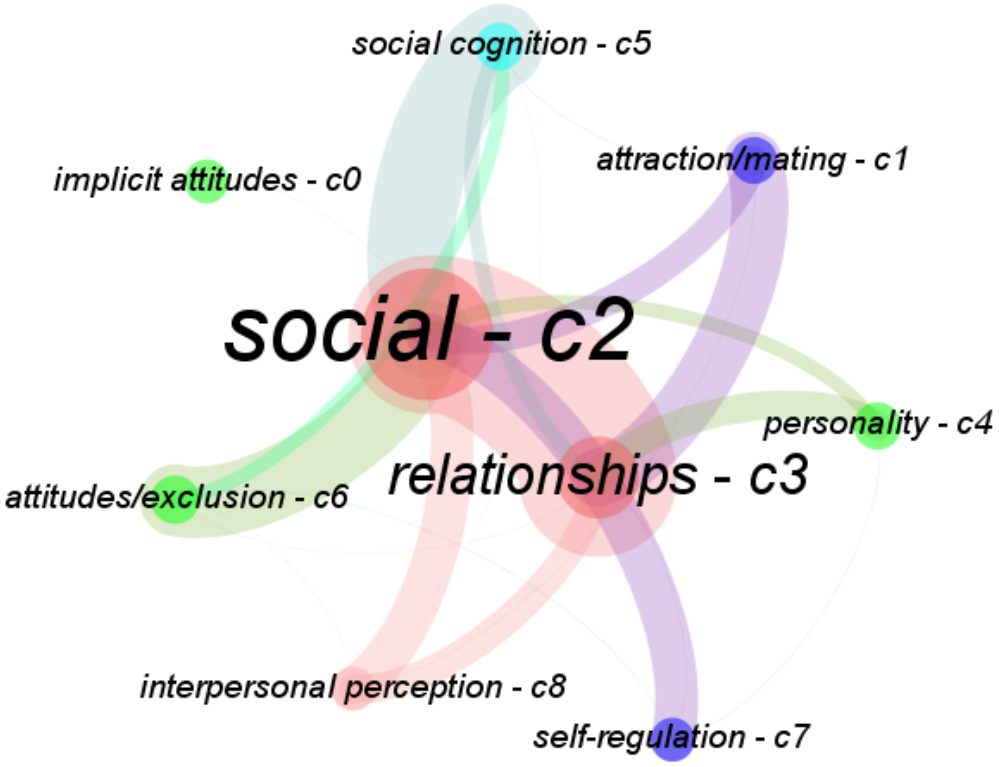


Figure 5

Relations between complex communities in social/personality psychology I: The interpersonal domain. Top: Papers. Bottom: Characteristic terms. A color image is available online.

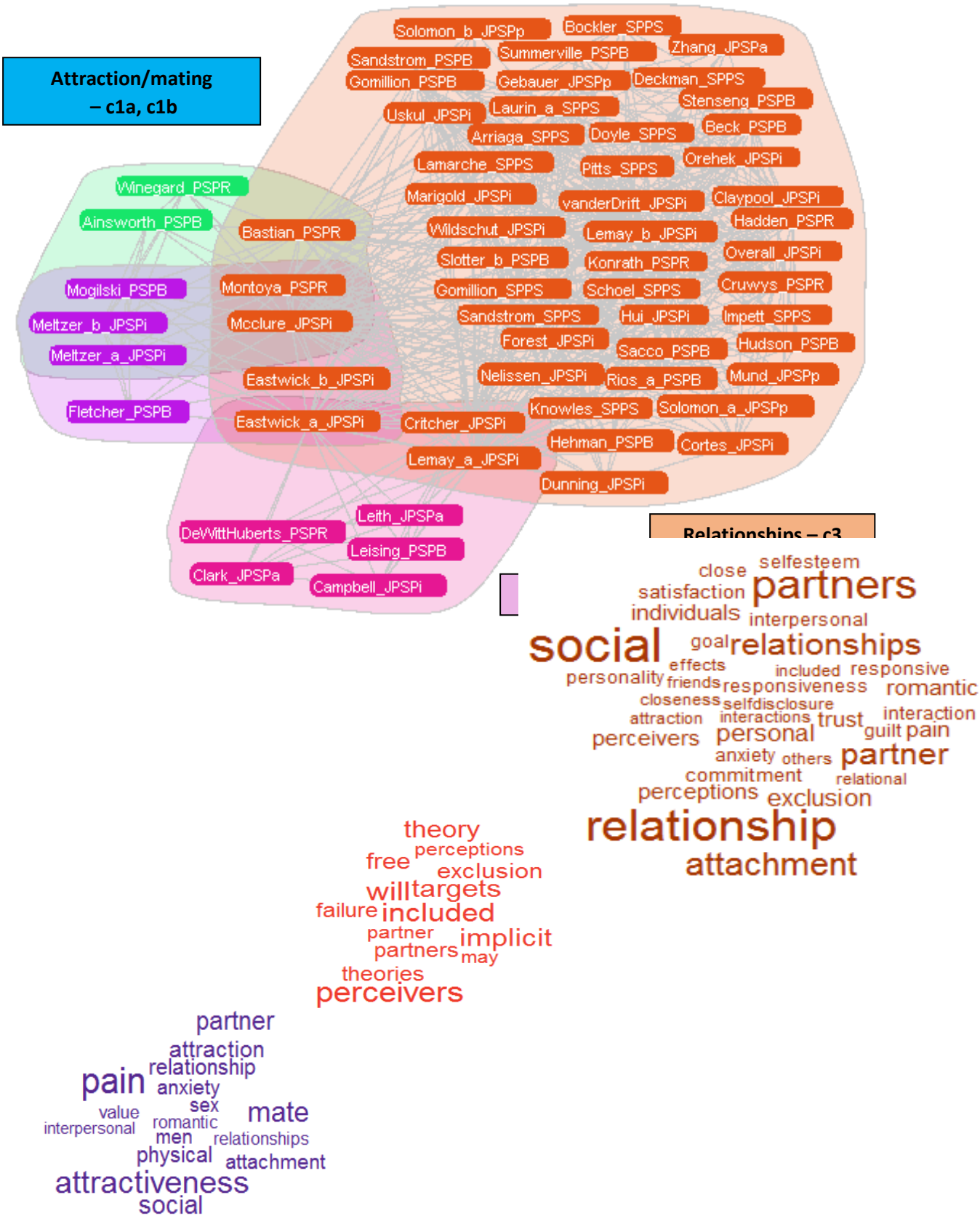


Figure 6

Relations between complex communities in social/personality psychology II: Connections from personality to social cognition. A color image is available in the online version of this article.

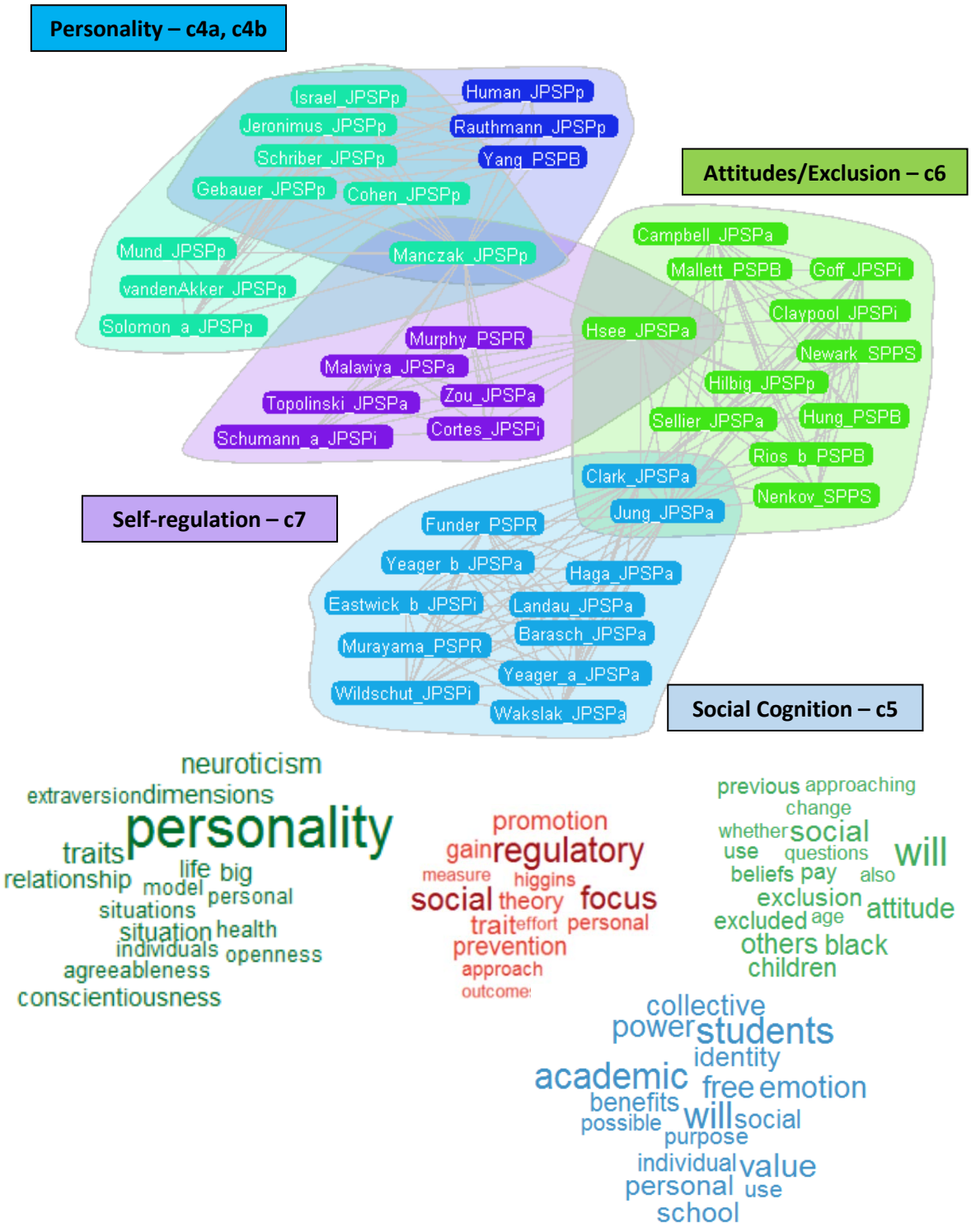


Figure 7

Relations between complex communities in social/personality psychology III. Implicit attitudes and a heterogeneous core. Links between community c2 and communities other than c1 are not shown, but are represented in Figure 4. A color image is available online.

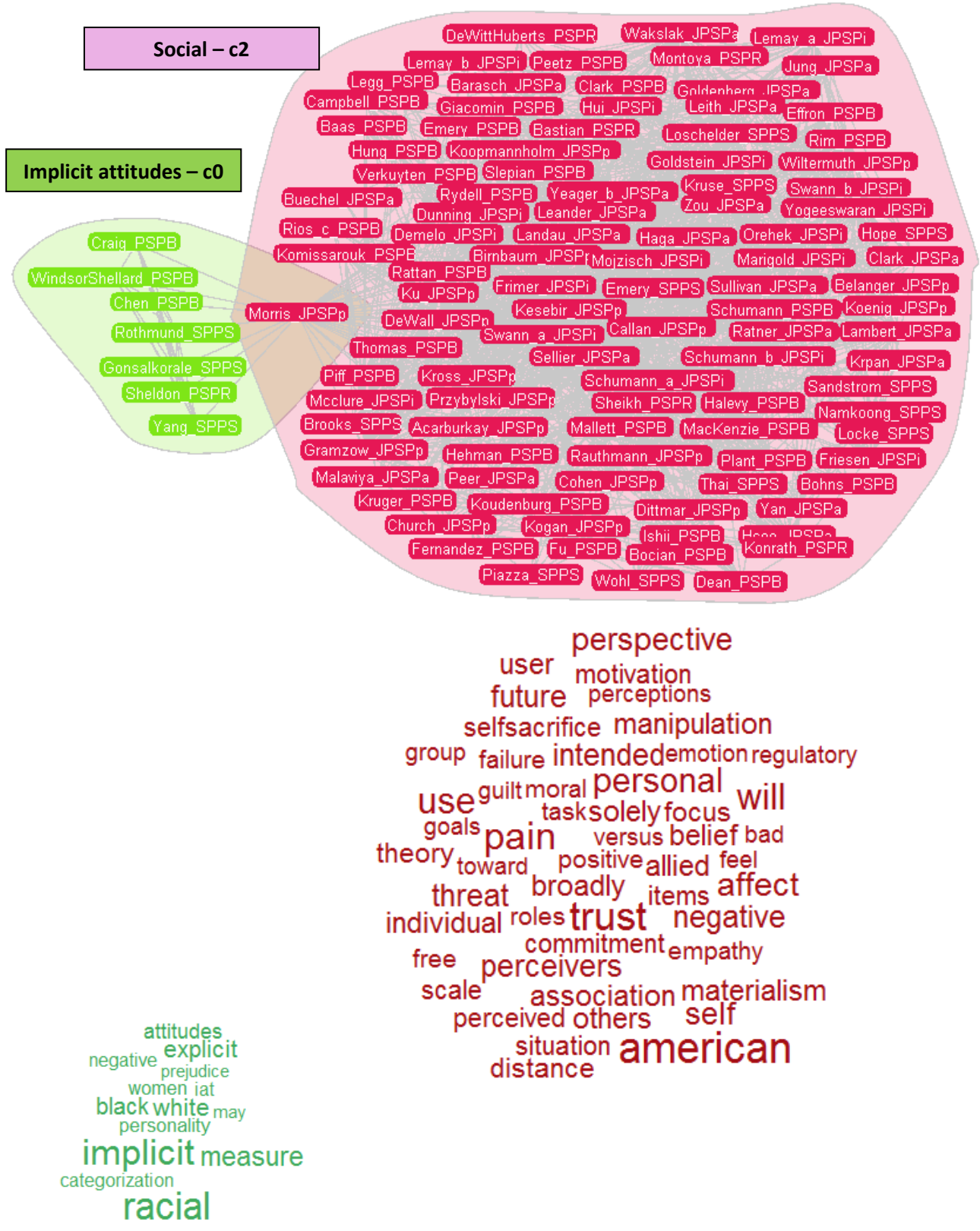


Figure 8

Citation relationships among major journals in social/personality psychology in 2014. Edge thickness corresponds to the similarity of reference lists of papers in different journals. Loops indicate similarity of papers within journals. Node size corresponds to weighted degree; node placement determined using Force Atlas algorithm. In panel (b), nodes and edges are adjusted for Impact Factor (Garfield, 2005). A color image is available in the online version of this article.