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Structure, Content and Inter-relationships between Self-aspects: Integrating Findings from the Social Identity and Self Complexity Traditions

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Abstract

The "social cure" literature from the social identity approach, and the self-complexity literature are both concerned with the structure and content of the self, and their relationship to wellbeing. Our work seeks to integrate these two approaches by investigating the exact characteristics of the self-concept that are associated with wellbeing, focusing in particular on self-aspects that are supportive, positive, representative and compatible ("superaspects"). In a pre-registered correlational study ($n = 640$) we found that the number of collective superaspects was positively associated with affect balance and quality of life (H1a), but the number of non-collective superaspects was positively associated only with affect balance (H1b). We found no evidence that similarity between self-aspects was negatively associated with wellbeing (H2), or that a self-reported measure of positivity was more strongly associated with wellbeing than a calculated measure (H3). These findings suggest potential avenues for an integrated measurement of the self-concept and its association with wellbeing.

KEYWORDS

self-complexity, social identity, social support, stress, wellbeing

1 | INTRODUCTION

Tajfel and Turner's work on social identity and self-categorisation (e.g. Tajfel et al., 1971; Turner et al., 1987) gave rise to an entire tradition of research focused on the mechanics of how social group memberships become part of the self, and how they are beneficial for psychological health. While there is now good evidence that perceived multiple group memberships improve wellbeing under stress (Haslam et al., 2016; Haslam et al., 2009; Jetten et al., 2014), questions remain about *how many* and *what type* of group memberships are beneficial. The majority of the extant "social cure" literature (Jetten et al., 2012) uses self-reported perceptions of belonging to multiple different groups (e.g., the multiple-group-membership subscale of the Exeter Identity Transition Scale; Haslam et al., 2008) rather than an actual count of group memberships. While this is a well-evidenced approach and undoubtedly useful in applied settings, it does not answer fundamental questions about the mechanism of this effect and the quantitative and qualitative attributes of the sense of self that are protective. It also limits the application options, as we cannot say with certainty which aspects of existing interventions are having the effect.

Banas and Smyth should be considered joint first author.

Two notable exceptions that *do* engage with the actual number and content of self-perceptions are the Social Identity Mapping approach (SIM; Bentley et al., 2019; Chang et al., 2016; Cruwys et al., 2016) and the self-complexity literature (Brown & Rafaeli, 2007; Linville, 1987; Pilarska & Suchańska, 2015; Rafaeli-Mor et al., 1999; Rafaeli-Mor & Steinberg, 2002). Both these sets of literature propose network-type models of the self-concept, in which the self is comprised of a number of different self-perceptions, associated with social groups, contexts, roles and moods. Each offers a method for mapping out the self-concept (Cruwys et al., 2016; Woolfolk et al., 2004) and taking measures of volume, complexity (Rafaeli-Mor & Steinberg, 2002), valence compartmentalisation (Showers, 1992; Showers & Kling, 1996), compatibility among aspects (Chayinska et al., 2017; Iyer et al., 2009; Smyth et al., 2019), overall positivity (DeMarco, 2018; Showers, 1995), importance and centrality of aspects (Leach et al., 2008). The approaches to—and understandings of—the self that underpin these two models are largely compatible. The two models also both engage with the ways in which the structure and content of the self-perception network might be protective of wellbeing under stress. However, there are a number of key departures that bear discussion.

While the SIM literature has now amassed an evidence base, there are key attributes of the self-concept (e.g., the identity content, attributes of the network beyond point-to-point comparisons, self-perceptions that are not explicitly linked to a "social group") with which it does not engage. Further, as this literature is still developing, there has been significant variation in design, measures and outcomes. The S-C literature, on the other hand, has been plagued by measurement problems (Pilarska & Suchańska, 2015) and has very limited evidence for any link between the number of self-perceptions (or, indeed, the variously calculated "complexity" of the self-network) and wellbeing under stress (Rafaeli-Mor & Steinberg, 2002). This is problematic, considering that protective ("stress-buffering") characteristics of a complex self are one of the central tenets of the self-complexity theorising (Linville, 1987).

The evidence for the benefits of a pure count of self-perceptions is limited in both sets of literature; the indication is that total number of reported "selves" is not a consistent predictor of measures of wellbeing in response to stress (Brown & Rafaeli, 2007; Cruwys et al., 2016). Recently, however, the SIM literature has proposed a resolution. Bentley et al. (2019) integrated the evidence and found that it is the number of groups of certain quality ("supergroups"), and not the total number of groups, that drives the association with wellbeing. "Supergroups" in this context refers to social group memberships that are supportive, positive, compatible with others, and those of which the participant feels typical or representative. The count of supergroups reported in the online SIM tool was consistently and significantly associated with better adjustment after transition (considered here as a stressor) across four studies reported in the article.

This finding constitutes an opportunity to develop the self-complexity approach and also work toward integrating the SIM and S-C approaches. It is possible that the supergroup concept can be similarly applied to the self-aspects reported in the self-complexity approach and that this application might clarify the relationship between self-concepts structure and wellbeing in this literature. The self-complexity approach, and specifically the trait-sort measurement tool (Linville, 1987), has a number of valuable strengths. First, the tool allows examination of identity content (through the attributes assigned to each "self"), which, in turn, allows us to consider valence (Showers, 1992, 1995; Showers & Zeigler-Hill, 2003), warmth/competence scores and similarity (Brown & Rafaeli, 2007) among self-perceptions. Second, there are a range of established indices to represent attributes of the whole network of selves, including the distributions of positive and negative content (Showers, 1992) and the dimensionality of the self-concept (Linville, 1985). Third, the S-C approach does not limit self-perceptions to social group memberships. Self-aspects can be context, role, relationship or mood based, as well as associated with group memberships.

The inclusion of self-aspects that do not rely on explicit group membership may appear counter-intuitive in a social identity approach, but it is a substantive advantage. This approach solves a number of measurement problems with the SIM approach. For instance, there is the matter of subjective validity—not all participants will think of themselves in entirely social terms and this approach allows participants to report on psychologically meaningful selves that would be excluded by listing only social group memberships. Further, this approach skirts around the problem of a participant not knowing (or not understanding) what we, as psychologists, mean by a "social group membership". It is not uncommon to field questions from participants about what "counts" as a group (e.g., roles, relationships, groups of two) in this kind of task, and allowing them to report any meaningful self-perception avoids this concern. Finally, this approach allows us to answer an important question as yet unaddressed in the SIM literature: does the effect of a supergroup necessarily depend on its *groupiness*, or would any self-perception that was positive, supportive, representative and compatible with others yield the same benefits? It also allows us to answer a matching question in the Self-Complexity literature: is the unstable relationship between self-complexity and wellbeing reported in this literature driven by noise in the model introduced by selves not associated with social groups?

Another strength of the S-C approach and a possible avenue for integration lies in the ability to use participant attribute choices to calculate indices pertaining to characteristics of the network that are not captured by the SIM approach. One notable example is the degree of similarity between the different self-aspects. Although the SIM tool does allow for a similarity score to be calculated, no predictions are being put forward about whether or not similarity should be associated with wellbeing (Cruwys et al., 2016). The S-C approach, on the other hand, does engage with this question: a similarity index (often called "overlap") can be calculated by comparing the attributes associated with different self-aspects—the assumption being that self-aspects that afford different attributes will be less similar than those sharing the same attributes. In addition, the

S-C approach puts forward an explicit prediction about the effect of greater similarity. Working from the "stress-buffering" model of self-concept complexity, the S-C approach predicts that a greater degree of similarity (i.e., more "overlap") of self-aspects would be associated with a less complex self-concept, leading, in turn, to poorer wellbeing (Brown & Rafaeli, 2007).

However, the S-C approach is also problematic, in that it has given rise to a number of different techniques for measuring self-complexity, none of which has become the gold standard, or is consistently found to be associated with wellbeing. As such, there are a number of lessons that can be drawn from the SIM approach that we anticipate will improve the predictive validity of the indices from the self-complexity task. The characteristics of a "supergroup" are clearly important in predicting adjustment, but not all of them are captured in the trait-sort task. While positivity is one aspect that is captured in both approaches, in the S-C measurement it is at a network level, rather than at the level of individual self-perceptions. That is, there is a nuance in the way in which positivity is conceptualised. In the SIM approach, positivity is a property of the group, whereas in the S-C approach, positivity is a property of "me, behaving as a member of this group". While core Social Identity Theory would cast the highly identified individual as an interchangeable member of the group (suggesting the self-level positivity property might be generalisable to the group), this is not a distinction that can be ignored. We can easily imagine, for example, a situation wherein an individual might *behave* very positively, in order to ingratiate themselves to a negative, hostile group. Alternatively, an individual might find a very positive, supportive group a safe space in which they can be behave less positively. In these cases, the "positivity" of the membership would be different under different approaches. Support, compatibility and representativeness, in turn, go entirely unmeasured in the S-C literature.

As such, there are two overall questions the present work is designed to answer. First, does the supergroup approach help resolve the contradictory results from the self-complexity literature, and identify the qualities of self-aspects that promote their association with wellbeing? Answering this question requires using the trait-sort task. In this way, we examine if the count of self-aspects that are identified by participants as being associated with a social group predicts wellbeing. Further, we attempt to replicate the "supergroup" effect with both the self-aspects associated with a social group and those that are not. Our second question is: are there features of the self-complexity measurement approach that could be usefully integrated with the self-report measures of the SIM tool (to obtain better quality data, more robust relationships, additional indices)? For example, once the SIM self-report measures are considered, is the similarity of self-aspects (something uniquely measured by the self-complexity approach) also associated with wellbeing in a way that would warrant its inclusion in the SIM approach? We also seek to examine whether positivity of self-aspects is more strongly related with wellbeing when it is measured using a self-report of the group rather than an attribute-based self-description measure.

In order to make our work comparable with the existing literature, we will focus on wellbeing constructs commonly used in validating the SIM tool (Bentley et al., 2019; Cruwys et al., 2016) and the Self-Complexity literature (Rafaeli-Mor et al., 1999; Rafaeli-Mor & Steinberg, 2002), covering the two key components of subjective wellbeing: cognitive and affective (Pavot et al., 1991). The cognitive component is often conceptualised as life satisfaction, which reflects a person's judgment of the quality of their life and is relatively stable over time: Diener et al. (1985) reported a correlation of 0.82 between two measurements on their Satisfaction with Life Scale, taken two months apart. The affective component can be conceptualised as the level of positive and negative affect, both of which may fluctuate over time and are typically measured with the Positive and Negative Affect Scale (PANAS; Watson et al., 1988). Although the Satisfaction with Life Scale and the PANAS are not without limitations, we selected them as our outcome measures because (a) they have been extensively used in both the SIM and S-C literature, and therefore will make direct comparisons straightforward; and (b) they are the most frequently used measures of subjective wellbeing and have been extensively validated in large non-clinical samples (Crawford & Henry, 2004; Pavot et al., 1991).

We therefore put forward the following hypotheses about the way in which our variables of interest should be related, after controlling for participant-perceived stress:

H1a In line with the Supergroup model, the number of collective self-aspects that are perceived as positive, supportive, representative and compatible with others will be positively associated with (i) life satisfaction and (ii) affect balance.

H1b In line with the Stress-Buffering Hypothesis, the number of non-collective self-aspects that are perceived as positive, supportive, representative and compatible with others will be positively associated with (i) life satisfaction and (ii) affect balance.

H2 Following the S-C model of the relationship between "overlap" and protective complexity, similarity of self-aspects (as calculated using the "overlap" formula, based on the attributes listed by participant) will be negatively associated with (i) life satisfaction and (ii) affect balance.

H3 On the basis of the strength of the existing published literature from both traditions, self-reported positivity of self-aspects will be more strongly associated with wellbeing than positivity calculated from the self-aspect attributes.

2 | METHOD

2.1 | Participants

Participants will be members of the general population. Participants will be recruited through subject pools at the authors' institutions, via social media, via Prolific Academic and Amazon Mechanical Turk. Participants from Prolific Academic

will be paid for 30 min of their time, participants recruited via Psychology subject pools will be given participation credit, other participants will not be reimbursed. Participants must be at least 18 years old. The target number of participants to be recruited is 614 (based on a power calculation performed in G*Power (Faul et al., 2007), assuming a target effect size of 0.13 (based on the lower end of the 95% confidence interval reported in the meta-analysis by Bentley et al., 2019), an alpha level of 0.05, and 90% power. There are no limits on age (other than the minimum of 18 years old), gender, language or background for participation-the processes to be examined are core self-processes and should apply across contexts.

2.1.1 | Exclusion Criteria

Participants will be excluded if it is determined that they are not responding conscientiously (see below measure), if they do not complete the self-complexity trait-sort task (at least one aspect described using at least one attribute) and if they do not complete at least one of the two wellbeing measures in full. In order to account for this possible attrition, data collection will over-sample (target $N = 700$) for the sample size indicated by our power analyses.

2.2 | Design and Materials

The study will be an observational, survey-based examination of self-concept structure, self-aspect attributes, perceived stress, life satisfaction and affect balance. An experimental design would be problematic in the context of examining the self-concept and any attempt would likely amount to a salience study. As such, we seek not to intervene in the self-perception and measure outcomes, but, instead, to examine the influence of different aspects of the two approaches on the patterns of relationships with wellbeing. Every participant will be presented the same set of measures, as our research questions are largely correlational in nature, not causal. The study protocol and analysis plan have been pre-registered on the Open Science Framework, see https://osf.io/ts6cr

2.2.1 | Self-structure

Shower's self-descriptive card sorting task (Showers, 1992; Showers & Kling, 1996) has been adapted for online use via Qualtrics (for exact instructions, see Appendix A). Participants will be asked to generate up to as many subtypes of themselves as they want to describe themselves (e.g., "me as a student", "me at work"). After labelling each subtype, they will be required to select as many attributes as they feel necessary to describe this subtype, from a list of 20 positive (e.g., "confident", "friendly", "happy") and 20 negative (e.g., "lazy", "tense", "irresponsible") attributes (Sharpe-Davidson, 2015). The list of attributes is deliberately valence-balanced and also represents a range of warmth- or competence-based descriptors. There is no limit on how many traits could be selected for any self-aspect, and participants will be instructed that the same attribute can be used as many times as necessary.

Participants will also be asked a range of self-report questions about each self-aspect, in line with the evidence from the SIM literature (Bentley et al., 2019) and the hypotheses of the current project. These will include:

1. Is there a social group membership associated with this aspect of yourself? (participants will respond YES or NO). This is a novel item that will allow us to establish which of the self-aspects listed are associated with a group membership (collective), and which are not (non-collective)
2. How positive do you feel about this aspect of yourself? (participants will respond on a 10-point scale ranging from *not at all positive* to *very positive*). The wording and response scale for this item are based on Bentley et al. (2019).
3. How representative are you of this group, role, context, relationship or state? (participants will respond on a 10-point scale ranging from *not at all representative* to *very representative*). The wording and response scale for this item are based on Bentley et al. (2019).
4. How easily can this aspect of yourself ([label piped in from participant responses]) get support from others? (participants will respond on a 10-point scale ranging from *not at all easily* to *very easily*). The response scale for this item is based directly on Bentley et al. (2019). The wording has been adapted to better suit the range of self-aspects that we expect participants to list.

2.2.2 | Compatibility

Following the completion of the self-description task, participants will also be asked to indicate how compatible each of their nominated selves is with each of their other nominated selves, in a pairwise fashion.[1] The item wording will be: "How easy is it to have both of these as aspects of yourself?" (measured on a 4-point scale ranging from *not at all easy* to *very easy*). The 4-point response scale for this item is based directly on Bentley et al. (2019). The wording has been adapted to better suit the card-sorting task.

[1]For the purposes of our planned analyses, compatibility will be calculated for collective and non-collective self-aspects separately. The SIM literature asks only about the compatibility between social group memberships, so we intend to emulate this by examining compatibility among the "social" selves reported. Our theorising also suggests that the non-collective selves included in self-complexity analysis might be a source of noise in the complexity–wellbeing relationship. As such, we seek to examine the compatibility among these and its relationship with wellbeing separately.

2.2.3 | Number of Superaspects

Following Bentley et al. (2019), a superaspect will be defined as a self-aspect that meets the following criteria: it is rated above the scale midpoint (i.e., 6 or above on a 10-point scale) on positivity, representativeness and access to support, and at least 50% of its compatibility scores with other self-aspects are described as *easy* or *very easy* (i.e., 3 or 4 on the 4-point scale). For each participant, we will calculate three indices: the total number of superaspects, the number of collective superaspects (those associated with a social group membership), and the number of non-collective superaspects (those not associated with a social group membership).

2.2.4 | "Social" Selves

One note to be borne in mind is the operational division between "social" aspects and the other aspects that comprise the self-concept. For our current purposes, in order to align with the SIM approach, "social" is synonymous with "collective"—these are the selves associated with a group membership. We acknowledge, in line with the S-C literature, that this is an incomplete understanding of what is "social". There are role identities, for example, that might not be associated with a social group in a reportable way, but that are still "social". We can think, for example, of a "me, when I'm lonely" personal self or professional role selves. These are not necessarily associated with an easily identifiable "group" a participant might report, but are clearly social self-definitions derived in comparison to relevant others, that have attendant cognitive, affective and behavioural implications. One of the purposes of the current study is to unpack this operationalisation somewhat and report on whether non-collective superaspects might be equally beneficial.

2.2.5 | Positivity index

In order to address questions around the predictive value of a direct self-report measure of positivity or a calculated measure of positivity (such as used in the self-complexity literature), an index of the general positivity of the self-concept will be calculated as a function of number of "positive" attributes, divided by the total number of attributes nominated (per subtype).

2.2.6 | Similarity index

Self-complexity index of similarity will be calculated for each participant, based on the attributes that they list. The relevant formula (Pilarska & Suchańska, 2015) is: Overlap = $(\sum i(\sum j\ C\ ij)/Tj)/n^{*}(n-1)$, where C is the number of common features in two aspects; T is the total number of features in the referent aspect; n is the total number of aspects in the person's sort and i and j vary from 0 to *n* (i and j unequal).

2.2.7 | Stress

As the precedent literature in both traditions considers wellbeing in response to stress, we will also include a measure of stress and control for perceived stress in analyses. The Perceived Stress Scale (Cohen, 1988) consists of ten items (e.g., "In the last month, how often have you been upset because of something that happened unexpectedly?", "In the last month, how often have you felt that you were unable to control the important things in your life?") scored on a 5-point Likert ranging from *never* to *very often*.

2.2.8 | Wellbeing

Wellbeing will be measured using two scales. First, we will mirror the SIM literature by examining the five-item Satisfaction with Life Scale (Diener et al., 1985; e.g., "If I could live my life over, I would change almost nothing"), with each item rated on a 7-point scale ranging from *strongly disagree* to *strongly agree*. Second, we will examine affect. Positive and negative affective states will measured using the Positive and Negative Affect Scale (PANAS; Watson et al., 1988). This scale consists of 10 items of positive affect (e.g., "interested", "excited", "enthusiastic") and 10 of negative affect (e.g., "disinterested", "upset", "scared"). Respondents will be asked to rate the extent to which they experienced each particular emotion within the previous month, with reference to a 5-point scale, ranging from *not at all* to *extremely*. A typical measurement involves self-report measures of both types of affect. The two dimensions of affect are often presented as separate variables and are not strongly correlated: Watson et al. (1988) report correlations between −0.12 and −0.23. We have chosen to use a measure of affect balance (Liu et al., 2013), which is calculated by subtracting the negative affect score from the positive affect score (Koydemir & Schutz, 2012). Affective wellbeing is a key aspect of happiness, or subjective wellbeing, and experiencing more pleasant than unpleasant emotions is perceived as desirable across all cultures (Koydemir et al., 2013).

2.3 | Positive controls

2.3.1 | Conscientious responding

In order to maximise the quality of the data, we will include the Conscientious Responding Scale (Marjanovic et al., 2014), which will be used to indicate which participants were not paying attention to the questionnaire. The conscientious responding scale is made up of instructional item content that directs responders how to answer each item (e.g., CRS item 3, "To respond to this question, please choose option number five, 'slightly agree'". This 5-item scale has been evaluated on self-report data and the threshold for exclusion is recommended at three incorrect responses out of a possible five. We will therefore exclude from the analyses any

participants who submit three or more incorrect responses on this scale. This approach will also allow us to exclude participants with insufficient English language proficiency.

2.3.2 | Perceived multiple group memberships

In order to demonstrate that our data is comparable to that used in the bulk of the Social Cure evidence, we also intend to replicate the relationship between perceptions of multiple group memberships and the Satisfaction with Life scale. The Social Cure evidence deals in perceptions of multiple group memberships, rather than actual counts of memberships, so we will also include the 4-item multiple group memberships scale from the Exeter Identity Transition Scale (EXITS; Haslam et al., 2008). Participants will respond using 7-point Likert-type scales, ranging from *strongly disagree* to *strongly agree*. An overall score will be calculated by averaging the responses, with a higher score indicating more perceived group memberships. The scores on this scale will be used as a positive control, but also for exploratory analyses.

2.4 | Additional measures

2.4.1 | Self-differentiation

Self-differentiation will be calculated using the commonly used H dimensionality statistic (Rafaeli-Mor & Steinberg, 2002), but also by considering the newer approach to calculation (Brown & Rafaeli, 2007; Pilarska & Suchańska, 2015; Sakaki, 2004) that deals only in number of aspects, overlap (as calculated above) and their ratio. H is, in practice, a measure of both the number of aspects reported and the proportion of attributes which are used across multiple self-aspects (overlap). A high H-score indicates a larger number of aspects with a lower degree of overlap. A low H-score, conversely, indicates a smaller number of self-aspects, with a greater degree of attribute sharedness. In the current data, these will all be calculated using an SPSS macro (Mavor, 2017). Scores will be calculated using the formulae available in Pilarska and Suchańska, (2015) and reproduced below. These scores will be used solely for exploratory analyses.

$$H = \log_2 n - \left(\sum_i n_i \log_2 n_i \right) / n,$$

where n is the total number of features, and n_i is the number of features that appear in a particular group combination.

$$SC = NSA/OL,$$

where *NSA* is the total number of self-aspects in the person's sort and *OL* is the person's overlap score.

2.4.2 | Social desirability

The Social Desirability Gamma Short Scale (Nießen et al., 2019) has been validated on English-speaking populations and comprises six items, three positive and three negative, such as: "When talking to someone, I always listen carefully to what the other person says", and "It has happened that I have taken advantage of someone in the past" (reverse-scored).[2] Participants will respond on a 5-point scale ranging from *doesn't apply at all* to *applies completely*.

2.4.3 | Demographics

We will measure the following demographic variables: age (in years), gender (participants will choose from the following categories: male, female, not listed, prefer not to say), ethnicity (participants will be given an open-text field to describe their ethnicity), English proficiency (participants will self-report on a 5-point scale anchored at "very poor" and "completely proficient"), student status, country of residence.

2.5 | Procedure

Participants will commence the study with the card-sort task, followed by items addressing self-aspects (including self-report positivity, compatibility, support and representativeness). Next, participants will complete the life satisfaction, affect, perceived stress and social desirability items. Finally, participants will complete a section of demographics and additional measures added for exploratory purposes. Conscientious responding items will be distributed throughout the questionnaire, so as to ensure participants are engaged with the study. Self-differentiation, overlap, numbers of selves and positivity indices will all be calculated after data has been collected.

2.6 | Analysis approach

We will first replicate the finding from the social identity literature, where perceived multiple group memberships are positively associated with wellbeing (Chang et al., 2016). In order to do this, we will inspect the size of Pearson's r correlation coefficient between perceived multiple group memberships (as measured by the EXITS scale) and (a) life satisfaction and (b) negative affect. We expect a significant positive correlation between multiple group memberships and life satisfaction, and a significant negative correlation between multiple group memberships and negative affect. This analysis will serve as a positive control, demonstrating that our data follow predicted patterns.

To address hypothesis 1a, we will conduct two multiple regression analyses (controlling for the average stress level), where: (a) IV:

[2]Due to a technical error, participants were only presented with 5 items of this scale. For a full list of departures from our pre-registration, see the documentation included on the OSF.

TABLE 1 Means, standard deviations, Cronbach's alpha and bivariate correlations between key variables

Variable	*M*	*SD*	Alpha	1	2	3	4	5	6	7	8	9
1. EXITS	4.28	1.40	0.87									
2. Negative affect	2.54	0.82	0.89	−0.05								
3. Life satisfaction	3.24	0.91	0.86	0.36**	−0.37**							
4. Affect balance	0.60	1.23	-	0.22**	−0.81**	0.52**						
5. Overlap	0.38	0.17	-	0.13**	−0.32**	0.23**	0.41**					
6. Perceived stress	3.06	0.70	0.87	−0.12**	0.75**	−0.49**	−0.77**	−0.34**				
7. Calculated positivity	0.80	0.16	-	0.26**	−0.34**	0.41**	0.43**	0.49**	−0.42**			
8. Self-reported positivity	0.81	0.22	-	0.23**	−0.26**	0.34**	0.36**	0.30**	−0.31**	0.62**		
9. No of social superaspects	1.96	2.35	-	0.30**	−0.04	0.22**	0.19**	0.21**	−0.10*	0.24**	0.26**	
10. No of non-collective superaspects	0.81	1.53	-	−0.04	−0.09*	0.10*	0.16**	0.10*	−0.12**	0.07	0.15**	−0.09*

Note: *M* and *SD* are used to represent mean and standard deviation, respectively. Alpha represents Cronbach's alpha internal consistency reliability.
*p <.05.
**p <.01.

number of collective superaspects; DV: mean of life satisfaction, and (b) IV: number of collective superaspects; DV: affect balance. In each of these, we will conduct a one-tailed test, comparing the null that $\beta \leq 0$ against the alternative that $\beta > 0$. To address hypothesis 1b, we will conduct two multiple regression analyses (controlling for the average stress level), where: (a) IV: number of non-collective superaspects, DV: mean of life satisfaction, and (b) IV: number of non-collective superaspects, DV: affect balance. In each of these, we will conduct a one-tailed test, comparing the null that $\beta \leq 0$ against the alternative that $\beta > 0$.

To address hypothesis 2, we will conduct two multiple regression analyses (controlling for the average stress level), where: (a) IV: similarity of self-aspects; DV: mean of life satisfaction, and (b) IV: similarity of self-aspects; DV: affect balance. In each of these, we will conduct a one-tailed test, comparing the null that $\beta \geq 0$ against the alternative that $\beta < 0$.

To address hypothesis 3, we will calculate the Pearson's *r* correlation coefficient between (a) self-reported positivity of self-aspects and mean of life satisfaction; (b) calculated positivity of self-aspects and mean of life satisfaction; (c) self-reported positivity of self-aspects and affect balance; (d) calculated positivity of self-aspects and affect balance. We will then perform a Steiger's Z-test (Steiger, 1980) comparing each pair of correlation coefficients: first, testing if the *r* from analysis (a) is larger than the *r* from analysis (b); then testing if the *r* from analysis (c) is larger than the *r* from analysis (d).

3 | RESULTS

3.1 | Participants

Six hundred and sixty-four participants completed the study, but only 640 met our inclusion criteria. There were 367 women and 268 men (4 participants' gender identity was not listed among the options and one did not provide an answer to this question). Participants were on average 29 years old (*SD* = 10.61), ranging from 18 to 73. Most participants identified as White (61%), followed by Asian (7.7%) and mixed-race (4.1%).

3.2 | Preliminary analyses

Descriptive statistics of key variables are presented in Table 1, alongside the correlations between them. All analyses were conducted in parallel by the two authors, using R and SPSS.[3]

To demonstrate that our data follow well-established patterns from the literature, we calculated the Pearson's *r* correlation coefficient between perceived multiple group memberships (as measured by the EXITS scale) and (a) life satisfaction and (b) negative affect. *P*-values for these correlations were calculated using a one-tailed test. In line with expectations, we found a significant positive correlation between multiple group memberships and life satisfaction ($r = 0.36$, $p < .001$[4]). Contrary to expectation, we found no evidence of a significant negative correlation between multiple group memberships and negative affect ($r = -0.05$, $p = .11$). However, in the context of the unprecedented time in which data were collected (during the 2020 COVID-19 pandemic) and the possibility that negative emotions might have been more common and inflated counts, we considered also the association between multiple group memberships and affect balance, to take the ratios of positive and negative into account. This analysis indicated the pattern we would expect—a positive association

[3]The questionnaires, data and analysis scripts are available on the OSF, at https://osf.io/zt7an

[4]In line with our pre-registration, this and the other *p*-values in this section have been calculated using a one-tailed test.

TABLE 2 Regression results testing the effect of social superaspects on life satisfaction and affect balance (Hypothesis 1a)

	Life satisfaction				Affect balance			
Predictor	*b*	*b* 95% CI	*beta*	*beta* 95% CI	*b*	*b* 95% CI	*beta*	*beta* 95% CI
(Intercept)	3.11**	[3.03, 3.19]			4.56**	[4.28, 4.84]		
Stress	−0.62**	[−0.70, −0.53]	−0.47	[−0.54, −0.41]	−1.33**	[−1.42, −1.24]	−0.76	[−0.81, −0.71]
Number of social superaspects	0.07**	[0.04, 0.09]	0.17	[0.10, 0.24]	0.06**	[0.04, 0.09]	0.12	[0.07, 0.17]
				$R^2 = 0.270$**				$R^2 = 0.609$**

Note: Stress was centred at the grand mean. A significant *b*-weight indicates that the beta-weight and semi-partial correlation are also significant. *b* represents unstandardised regression weights. *beta* indicates the standardised regression weights. Values in square brackets indicate the 95% confidence interval around the point estimate. [Corrections made on 18 January 2022, after first online publication: 'social supergroups' in the Table caption and in the Predictor column have been corrected to 'social superaspects' in this version.]

**p <.01.

TABLE 3 Regression results testing the effect of non-collective superaspects on life satisfaction and affect balance (Hypothesis 1b)

	Life satisfaction				Affect balance			
Predictor	*b*	*b* 95% CI	*beta*	*beta* 95% CI	*b*	*b* 95% CI	*beta*	*beta* 95% CI
(Intercept)	5.16	[4.87, 5.45]			4.65	[4.37, 4.94]		
Stress	−0.63**	[−0.72, −0.54]	−0.49	[−0.55, −0.42]	−1.34**	[−1.42, −1.25]	−0.76	[−0.81, −0.71]
Number of non-collective superaspects	0.02	[−0.02, 0.06]	0.04	[−0.03, 0.11]	0.05*	[0.01, 0.09]	0.06	[0.01, 0.11]
				$R^2 = 0.242$**				$R^2 = 0.598$**

Note: Stress was centred at the grand mean. A significant *b*-weight indicates that the beta-weight and semi-partial correlation are also significant. *b* represents unstandardised regression weights. *beta* indicates the standardised regression weights. Values in square brackets indicate the 95% confidence interval around the point estimate. [Corrections made on 18 January 2022, after first online publication: 'personal superaspects' in the Table caption and in the Predictor column have been corrected to 'non-collective superaspects' in this version.]

*p <.05.

**p <.01.

between multiple group memberships and a more positive-tending affect balance ($r = 0.22$, $p < .001$).

3.3 | Hypothesised effects

In addressing hypothesis 1a, multiple regression analyses (controlling for the average stress level; see Table 2), indicated that the number of "social" super-aspects was significantly positively correlated with life satisfaction and also affect balance suggesting that, in line with Bentley et al. (2019), greater numbers of social superaspects were associated with better wellbeing.[5] In addressing hypothesis 1b, multiple regression analyses (controlling for the average stress level; see Table 3), indicated that the number of non-collective superaspects was not significantly associated with life satisfaction, but was significantly associated with affect balance. These mixed results suggest a possible relationship between the number of non-collective superaspects and affect, but provide no evidence of a link to general satisfaction.

In addressing hypothesis 2, we conducted two multiple regression analyses (controlling for the average stress level; see Table 4) and conducted one-tailed tests: testing the alternative hypothesis that the similarity of self-aspects (as measured by Linville's "overlap") is negatively associated with life satisfaction and affect balance ($\beta < 0$), against the null hypothesis that the association is positive or equal to zero ($\beta \geq 0$). The results did not allow us to reject the null hypothesis for either life satisfaction or affect balance. Indeed, one-tailed tests in the opposite direction (with the alternative hypothesis that similarity of self-aspects is positively associated with life satisfaction and affect balance) indicated a significant *positive* association with life satisfaction and also affect balance.

In addressing hypothesis 3, correlation coefficients were compared using Steiger's Z approach. Both positivity measures were positively associated with life satisfaction ($r_{selfreport} = 0.34$, $p < .001$; $r_{calculated} = 0.43$, $p < .001$). A one-tailed test indicated no evidence that the self-report positivity of the self was more strongly related to life satisfaction than self- positivity calculated on the basis of assigned attributes ($p = .99$; *95% CI Z-diff*: [−0.16,0.03]).[6] Each pos-

[5]In this one and all following analyses, we applied a Bonferroni correction to account for multiple testing. However, this correction did not change our conclusions about the significance of any of the effects identified.

[6]NB: on the basis of the correlation coefficients, the reverse one-tailed test was also performed in an exploratory manner and indicated a significant difference in the opposite direction, the calculated positivity being a stronger associate of both wellbeing measures.

TABLE 4 Regression results testing the effect of self-aspect similarity (calculated using the self-complexity overlap formula) on life satisfaction and affect balance (Hypothesis 2)

	Life satisfaction				Affect balance			
Predictor	*b*	*b* 95% CI	*beta*	*beta* 95% CI	*b*	*b* 95% CI	*beta*	*beta* 95% CI
(Intercept)	4.91**	[4.54, 5.29]			3.96**	[3.60, 4.32]		
Stress	−0.60**	[−0.70, −0.50]	−0.46	[−0.53, −0.39]	−1.24**	[−1.33, −1.15]	−0.71	[−0.77, −0.66]
Self-aspect similarity	0.00*	[0.00, 0.01]	0.08	[0.00, 0.15]	0.01**	[0.01, 0.02]	0.16	[0.11, 0.22]
			$R^2 = 0.242$** 95% CI [.19,0.30]				$R^2 = 0.618$** 95% CI [.57,0.65]	

Note: Stress was centred at the grand mean. A significant *b*-weight indicates the beta-weight and semi-partial correlation are also significant. *b* represents unstandardised regression weights. *beta* indicates the standardised regression weights. Values in square brackets indicate the 95% confidence interval around the point estimate.

*$p < .05$.

**$p < .01$.

itivity measure was also associated with affect balance ($r_{\text{self-report}} = 0.35, p < .0001$; $r_{\text{calculated}} = 0.46, p < .0001$). Again, a one-tailed test indicated no evidence that the self-report positivity of the self was more strongly related to affect balance than self-positivity calculated on the basis of assigned attributes ($p = .99$; *95% CI Z-diff*: [−0.16,0.04]).

3.4 | Exploratory Analyses

To inspect our data more fully, a short series of exploratory analyses were also performed. These analyses addressed five key questions arising from our hypothesised results. First, we noted that participants provided a number of non-collective superaspects and their association with wellbeing was unclear. In order to understand this more fully, we examined the aspect labels to determine the nature of a "non-collective" superaspect (Question 1). Next, given that our participants reported superaspects *not* associated with social groups, we wondered if the social group is a necessary attribute or a useful way to divide our data. As such, we examined the relationship between the count of positive, supportive, representative and compatible self-aspects (regardless of whether they were associated with a social group) and wellbeing measures (Question 2). In a similar vein, as we are only explaining between 20% and 30% of the variance in life satisfaction with the superaspect counts, we evaluated how well our data supported a pure-count "the more the merrier" (Chang et al., 2016) model of wellbeing that ignored the quality of the self-aspect or group membership (Question 3).

In the context of using the Showers (1995) trait-sort task as our main measurement of the self-concept, we must also necessarily consider whether the data are simply not suited to a SIM approach and might more usefully be examined using the approaches intended for the trait-sort task. As such, we sought to examine how well our data supported a traditional self- complexity model where the h measure of dimensionality (Linvillle, 1987) or the complexity measure (per Sakaki, 2004) should be associated with wellbeing (Question 4). In a related line of enquiry, we also sought to examine the relationship between the similarity measure from the S-C tradition (overlap) and the self-report compatibility measure used in the SIM approach. Where the SIM approach values compatibility as the important measure, similarity is central to the S-C approach. We sought to examine how different these two measures really were in our sample. That is, how strongly associated is the compatibly score with the calculated degree of similarity (Question 5).[7]

3.5 | Exploratory findings

3.5.1 | What is the nature of a non-collective superaspect?

Our analyses addressing hypothesis 1 indicated that, while the count of social superaspects is more *strongly associated with* wellbeing,

[7]Two further sets of exploratory analyses were conducted, with a primary focus on the quality of our data. First, given that both the trait-sort and the SIM tool are self-presentation tasks, we needed to consider if social desirability modified our findings. Second, we sought to determine whether there were any impacts of the global upheaval of lifestyle (including limited social contact, working from home) associated with the COVID-19 pandemic. There was a weak correlation between social desirability and our outcome variables (r=0.15 for life satisfaction, r=0.17 for affect balance, ps<0.001). We re-ran all analyses associated with testing hypotheses 1 and 2, controlling for social desirability, but the pattern of results remained the same. Participants were also asked a range of items about their circumstances including whether they were working, studying, with whom they were living and how they were interacting with others. We anticipated that these circumstances might have had impacts on stress, affect, life satisfaction and social group membership in ways that confounded our study. A one-way ANOVA was used to compare scores on these four key variables across work, study and living situation categories. Results indicated that work, study and living situation had no systematic impact on affect balance, life satisfaction or perceptions or multiple group memberships. As the interacting-with-others items were non-exclusive, these were summed (higher score indicates more modes of interaction) and spearman rank correlations with the four key variables were considered. Results indicated small relationships with life satisfaction (rho=0.11, *p*=.005), stress (rho=−0.09, *p*=.03), affect balance (rho=0.11, *p*=.006) and multiple group memberships (rho=0.22, *p*<.0001). However, as we did not collect a baseline or ask participants to compare these interactions to their typical interactions, no further action was taken with these data.

TABLE 5 Categorisation of non-collective superaspects

Category	Examples	Count	% of overall non-collective superaspects
Relationship	"with friends"; "me with my mum"; "me with boyfriend"	239	46%
Activity	"me as a crossfitter"; "me when I'm writing"; "me at the computer"	83	16%
Role	"me at work"; "student"; "me as mentor'	66	13%
Location	"me in the garden"; "me in the car"; "me at the cinema"	53	10%
Alone	"me alone"; "me by myself";	36	7%
Trait	"supportive"; "someone who lives healthy"; "me as Italian"	17	3%
Pets	"me with my dog"; "we with a pet"	10	2%
State	"composed"; "happy"; "me being proactive"	9	2%
		518	

non-collective superaspects were also associated with affect balance. While it is potentially unexpected that a self not associated with a social group could be positive, supportive, representative and compatible at all, participants report a mean of slightly less than 1 of these per participant ($M = 0.81$, $SD = 1.53$, range = 0–10), as compared to nearly 2 collective super aspects per participants ($M = 1.96$, $SD = 2.35$, range = 0–15). Our 640 participants provided 518 such aspects, so this is a non-trivial category of self-aspects. To unpack this, we sought to examine the labels assigned to non-collective superaspects, with a view to examining the nature of these. We broadly anticipated a majority of these would still be *social*, but not collective (e.g., roles, relationships). Table 5 gives a summary of the categories of label assigned to non-collective superaspects. Five labels were uncategorisable, due to insufficient information or idiosyncratic labelling. Our basic thematic analysis of the labels indicated one telling finding: nearly half (46%) of the non-collective superaspects listed were easily characterised as relational (e.g., "Me with my mum", "me with my best friend") and the vast majority of these were descriptive of dyads. As anticipated, the aspects that participants were designating "not associated with a social group" were still social to some degree.

3.5.2 | What is the relationship between the count of positive, supportive, representative and compatible self-aspects (regardless of type) and wellbeing measures?

In our hypothesised analysis, in order to collate findings comparable to that from the SIM tradition, compatibility was only considered *within* the categories of social group selves and non-social group-selves. This allows us to approximate the SIM approach of drawing compatibility links between social groups only. Given that we find evidence for a wellbeing effect of superaspects *not* associated with a group, a count of "total" superaspects was calculated in two ways. First, as a simple sum of the collective super aspects and non-collective superaspects derived from the like-with-like compatibility analyses. Second, a count of "total" superaspects (positive, supportive, representative and compatible aspects) was re-calculated with a different approach to categorising compatibility among self-aspects. In this approach, compatibility links were considered among all reported self-aspects, rather than a like-with-like approach (i.e., compatibility links between collective and non-collective aspects were considered). Taking a similar approach to analysis associated with hypothesis 3, each count was compared to the collective superaspect count in terms of its correlation with our wellbeing measures. In this way, we treat the established SIM approach as the gold standard and examine possible alternative approaches. Correlations among the counts and wellbeing measures are presented in Table 6. Taking an exploratory approach, two-tailed Steiger's Z analyses indicated that:

1. Count of collective superaspects was more strongly associated with life satisfaction than count of non-collective superaspects ($z = 2.11$, $p = .035$), but we find no such effect in correlations with affect balance ($z = 0.49$, $p = .65$).
2. We have not demonstrated a difference in association with life satisfaction between count of collective superaspects and the sum approach to total superaspects ($z = -1.23$, $p = .22$), but we did find a difference in correlations with affect balance ($z = -2.44$, $p = .01$), such that the sum approach to total superaspects was more strongly positively associated with affect balance than the count of only collective superaspects.
3. We cannot demonstrate a difference in association with life satisfaction ($z = -0.71$, $p = .48$) or affect balance ($z = -0.32$, $p = .75$) between count of collective superaspects and the all-type approach to total superaspects

These analyses indicate no clear pattern, possibly suggesting that it is the "super" that is key, rather than the "group".

TABLE 6 Descriptive statistics and correlations between different counts of superaspects (Exploratory Analysis)

	Mean (*SD*)	Group super	No group super	Sum super	All type super	Life satisfaction
Group super	1.96 (2.35)					
No group super	0.81(1.53)	−0.087*				
Sum super	2.77(2.69)	0.825**	0.490**			
All type super	3.37 (2.52)	0.738**	0.386**	0.931**		
Life satisfaction	3.24 (0.91)	0.218**	0.097*	0.246**	0.198**	
Affect balance	0.59 (1.11)	0.189**	0.163**	0.258**	0.198**	0.517**

*p <.05.
**p <.01.

TABLE 7 Regression results using H index as a predictor of wellbeing (Exploratory Analysis)

	Life satisfaction				Affect balance			
Predictor	*b*	*b* 95% CI	*beta*	*beta* 95% CI	*b*	*b* 95% CI	*beta*	*beta* 95% CI
(Intercept)	3.23	[3.05, 3.41]			0.27	[0.09, 0.45]		
Stress	−0.64**	[−0.73, -0.55]	−0.49	[−0.56, -0.42]	−1.38**	[−1.46, −1.29]	−0.79	[−0.84, −0.74]
H index	0.00	[-0.05, 0.06]	0.00	[−0.06, 0.07]	0.11**	[0.06, 0.17]	0.10	[0.05, 0.15]
			R^2 = 0.241** 95% CI[.19, 0.29]				R^2 = 0.604** 95% CI[.56, 0.64]	

Note.: Stress was centred at the grand mean. A significant b-weight indicates that the beta-weight and semi-partial correlation are also significant. b represents unstandardised regression weights. beta indicates the standardised regression weights. Values in square brackets indicate the 95% confidence interval around the point estimate. P-values have been calculated using a one-tailed test.
*p < .05;
**p < .01.

3.5.3 | How well does our data support a pure-count "the more the merrier" model of wellbeing that ignores the quality of the self-aspect or group membership?

A series of linear regressions models was run, modelling life satisfaction and affect balance separately. In each model, we controlled for perceived stress and the independent variables were: total number of aspects, number of collective aspects, number of non-collective aspects. None of these counts was associated with life satisfaction. Collective aspect count and total aspect count had a small effect on affect balance (β_{soctot} = 0.08, p = .006; β_{total} = 0.08, p = .002), replicating early pure-count-based findings.

3.5.4 | How well does our data support a traditional self-complexity model?

A series of linear regression models was run, predicting life satisfaction and affect balance from the constructs that are typically used in the self-complexity literature: H-index and number of self-aspects divided by their overlap (NASP/OL). In all analyses we controlled for stress. The results are presented in Tables 7 and 8. The H-index was not significantly associated with life satisfaction, but was associated with affect balance: the higher the H-index, the more positive the balance between positive and negative affect. The NASP/OL index again was not associated with life satisfaction, but was with affect balance: the higher the NASP/OL index, the more negative affect balance was.

3.5.5 | Are pairs of aspects that are more similar (i.e., have a higher overlap score) also perceived as more compatible?

We found evidence of a small but significant correlation between overlap and compatibility, calculated for each pair of self-aspects (r = 0.22, p < .001). This indicates that self-aspects that shared the same attributes were also perceived as more compatible.

4 | DISCUSSION

The current study sought to examine two broad questions, with a view to integrating the valuable aspects of the self-complexity and social-identity-mapping approaches to considering the relationship between self-concept structure and wellbeing. First, we sought evidence for our expectation that the Bentley et al. (2019) supergroup

TABLE 8 Regression results using NASP/OL as a predictor of wellbeing (Exploratory Analysis)

	Life satisfaction				Affect balance			
Predictor	*b*	*b* 95% CI	*beta*	*beta* 95% CI	*b*	*b* 95% CI	*beta*	*beta* 95% CI
(Intercept)	3.24	[3.14, 3.34]			0.73	[0.63, 0.82]		
Stress	−0.63**	[−0.73, −0.54]	−0.49	[−0.56, −0.41]	−1.30**	[−1.39, −1.21]	−0.75	[−0.81, −0.70]
NASP/OL	−0.00	[−0.00, 0.00]	−0.01	[−0.08, 0.06]	−0.00**	[−0.01, −0.00]	−0.08	[−0.14, −0.03]
			$R^2 = 0.239$** 95% CI[.18, 0.29]				$R^2 = 0.602$** 95% CI[.56, 0.64]	

Note.: Stress was centred at the grand mean. A significant b-weight indicates that the beta-weight and semi-partial correlation are also significant. b represents unstandardised regression weights. beta indicates the standardised regression weights. Values in square brackets indicate the 95% confidence interval around the point estimate. P-values have been calculated using a one-tailed test.

*Indicates $p < .05$.

**Indicates $p < .01$.

approach might help resolve the contradictory results from the self-complexity literature and identify the qualities of self-aspects that promote their association with wellbeing. Second, we examined the unique contributions of the self-complexity approach (including overlap (Linville, 1987) and the Showers (1995) approach to calculated positivity of selves) to determine if these could be usefully integrated with the self-report measures of the SIM tool.

4.1 | Supergroups

We hypothesised that, in line with recent evidence from the SIM tradition (Bentley et al., 2019), group-related self-aspects that met the criteria of a supergroup would be positively associated with wellbeing, when considered in a model that also includes stress (H1a). Our data supported this hypothesis, indicating a positive relationship between the count of supergroups and both generalised life satisfaction and time-anchored affect balance. This finding is hopeful for both bodies of literature under consideration. First, it provides supportive evidence for the relatively new supergroup model of the SIM effect. Further to which, it does this using a different self-concept mapping tool (but the same supergroup items), allowing us to suggest that the wellbeing effect is not an artefact of the possibly therapeutic act of building the visual map of self and social connections. Second, it indicates a possible way forward for the self-complexity literature in resolving the oft-reported contradictory or null findings on the relationship between the number and differentiation of self-aspects and wellbeing. Self-complexity researchers might usefully consider adding self-report items to capture which of the reported self-aspects are associated with a social group, alongside positivity, compatibility, social support and representativeness.

In order to get the full picture of these effects and to take the self-complexity view into account, we also hypothesised that, in line with the stress-buffering hypothesis (Linville, 1987), the self-aspects not associated with a social group should demonstrate similar effects. That is, superaspects not associated with a social group should also be positively associated with wellbeing (H1b). Our findings on this point are mixed. The count of non-collective superaspects demonstrated no association with generalised life satisfaction, but we find the expected effects for time-anchored affect balance. These findings raise some interesting questions about both the non-collective superaspects themselves, as well as about the time-course and mechanism of their impact.

4.1.1 | Non-collective superaspects

As such, our first set of exploratory analyses sought to examine what, if anything, we could determine about the nature of a non-collective superaspect. That is, how had participants labelled the aspects they had designated positive, supportive, representative and compatible, but *not* associated with a social group? Our findings indicate that the majority of these non-collective selves are still social: about half of the reported non-collective superaspects were associated with a relationship or role. However, there were also a significant portion of these aspects that were not clearly social (e.g., activity or location based). This has implications for both the theoretical and practical measurement of the self-concept. From a practical standpoint, this underscores how critical the way in which we word instructions on these tasks is. In asking participants to designate which aspects are "associated with a social group" without providing any definition of a social group we have unwittingly excluded groups of two, owing to colloquial usage of the term "group". Theoretically speaking, we also demonstrate here that it is possible for an individual to derive positivity and social support without necessarily perceiving a social group membership. In the context of the social-support-as-mechanism model of the social cure (van Dick et al., 2018), this is an interesting finding.

4.1.2 | Superaspects without consideration of group membership

In order to follow this idea to its logical conclusion, we then performed a second set of exploratory analyses that did not privilege the self-aspects associated with groups. In these analyses, we examined the association

between wellbeing and counts of superaspects calculated in two ways: first, by summing up both the collective and non-collective superaspects to put both types on equal footing and, second, by discarding the group-membership information and counting supergroups on the basis of all-aspect compatibility. These alternative counts were then compared to the SIM approach of considering only the group-related supergroups. In line with our findings on hypothesis 1b, we found here that there were divergences in our two wellbeing measures. In associations with life satisfaction—the wellbeing measure commonly used in the SIM literature—the count of social superaspects was the most strongly associated (but not significantly different from the sum approach). In associations with more proximal item-anchored affect balance, however, we found that including the non-collective superaspects in the count (via summing the two types) improved the association significantly.

4.1.3 | Do they need to be "super"?

Finally, a third set of exploratory analyses examined whether we need to engage with the quality of the groups at all or whether a pure-count model might hold in our data. Analyses failed to demonstrate any link between pure counts and life satisfaction, but we found some small, positive relationships between social pure count, total pure count and affect balance. However, these models explained less of the variance in affect balance than the superaspect models, indicating that, while there are some small effects, the pure counts are a much poorer way of modelling the association between self-concept structure and wellbeing.

4.1.4 | Supergroups and wellbeing: the take-home message

Taken together, these findings from our hypothesised and exploratory analyses suggest four key learnings. First, that examining the participant's perceptions of the quality of the group membership or self-aspect, in terms of positivity, compatibility, representativeness and support, is a useful approach and demonstrates a good relationship with wellbeing measures. Second, that the task instructions are crucial and what a participant considers a "social group" may diverge from our theoretical understanding of the same. Third, that there is some value in considering the non-collective superaspects alongside those associated with a social group, particularly in considering time-anchored, state-based wellbeing. Finally, no matter which way you slice a pure count, models that consider the nature and content of the group membership or self-aspect are superior in demonstrating an association with wellbeing.

4.2 | What we can learn from the self-complexity approach

The remainder of our hypotheses dealt with what the SIM approach might learn from the self-complexity approach. This analysis examined two key features of the trait-sort measurement toolbox, both calculated on the basis of the attributes assigned to each self: overlap (similarity of self-aspects) and positivity (ratio of positive to negative attributes assigned).

4.2.1 | Similarity

We hypothesised that overlap, as a measure of self-aspect similarity, might be a useful addition to the SIM model that currently deals mainly in compatibility (Bentley et al., 2019). In line with the existing self-complexity literature, we hypothesised that increased overlap should be associated with poorer wellbeing, as suggested by the spreading activation mechanism proposed by Linville (1985, 1987). This hypothesis is also broadly in line with the literature on Social Identity Complexity (SIC; Roccas & Brewer, 2002), which suggests that the greater the degree of overlap, the fewer and more narrow avenues an individual has to seek social support (Jetten et al., 2015) and the lesser the degree to which the individual might have access to multiple distinct sources of identity, support and connection that might additively combine to improve overall wellbeing (Jetten et al., 2015; Sønderlund et al., 2017; Zimet et al., 1988).

Our findings demonstrated, in fact, the opposite. The greater degree of overlap, or similarity, among the reported self-aspects, the greater the life satisfaction and the more positive the affect balance. This finding is not without precedent, however. First, evidence from the SIC literature suggests that the factual similarity is not what is crucial here, rather the individual's *perceptions* of overlap (Sønderlund et al., 2017). In our study, and the traditional overlap index, participants were not *asked* how similar the self-aspects were. Rather, the degree of similarity was calculated on the basis of the patterns of attribute usage and re-usage across aspects. This allows for the possibility that we were measuring an "objective"[8] similarity, where the crucial measure is, in fact, subjective similarity. Second, there is some discussion in the self-complexity literature (indeed, in the original paper) about the difficulty and chronic load of managing a more complex or diverse set of selves (Linville, 1987). It may be that what we are capturing here is the net effect of balancing access to social support and positive sources of self-definition with the work of maintaining a differentiated self.

In order to unpack this idea, we performed some exploratory analysis examining the relationship between the calculated degree of similarity among selves and the participant-reported degree of compatibility in a pairwise fashion. Findings indicated a small, positive correlation: self-pairs that were more similar (i.e., were described with more of the same attributes) were also perceived as more compatible. This speaks to a possible mechanism of effect: we

[8]NB: the authors would like to emphasise that an index calculated from self-ascribed attributes is not *objective* in the sense that it is without subjectivity on the part of the participant in choosing the attributes to assign. The index itself, however, is entirely without the input or awareness of the participant and captures distribution patterns in a non-subjective manner.

already know that a greater degree of compatibility has positive effects on wellbeing (Iyer et al., 2009) and we also know that we have not measured similarity in the same way as the social identity literature. This raises an intriguing possibility that bears further research: self-report measures of similarity might measure something closer to compatibility and we may be able to simplify models to exclude similarity in favour of compatibility entirely.

4.2.2 | Positivity

Finally, we hypothesised that the self-report positivity measure drawn from the SIM tool would be more strongly associated with the wellbeing measures than the self-complexity approach where positivity is calculated on the basis of the ratio of positive to negative attributes assigned. Our analysis indicated no support for this hypothesis—we cannot demonstrate a difference in strength in the hypothesised direction. On the basis of the correlation coefficients, we then performed exploratory analysis in the opposite direction and found clear effects: the calculated positivity measure was more strongly correlated with both wellbeing measures than the self-report positivity measure. It is difficult to say immediately what a researcher hoping to map self-concept should do with this information. While the effects are clear, they run in opposition to the rest of our suite of findings, which all point to the value of self-reported perceptions over any quantitative attribute-based measure. With regard to the affect balance finding, it is possible there is some overlap between the positive and negative attributes participants used to describe self-aspects and the positive and negative affects used to described affective state on the PANAS, leading to inflation. This does not, however, explain our finding on life satisfaction. One possible explanation for this pattern of results is the difference in approach to conceptualising the positivity of the group. As briefly described above, the SIM approach to positivity is anchored in perceptions of the group, where the S-C approach anchors the positivity in the attributes that would describe "me, as a member of this group". In many cases, these may be the same thing, but there are also cases where they might diverge. It is possible that this difference drove the unexpected effect—where the positivity of the group is undoubtedly related to wellbeing, we present here evidence that suggests that the positivity of the self-perception as a member of a group might be more strongly related.

4.2.3 | Linville's H and Sakaki's complexity

In the self-complexity literature, each of the attributes of the self-network (number of aspects, overlap, positivity) are typically not considered individually and, instead, are integrated into indices. To explore how well the traditional self-complexity models hold up in our data, we performed two sets of exploratory analyses. The first examined the relationship between Linville (1987) dimensionality measure and wellbeing, when controlling for stress. The second examined the relationship between Sakaki's (2004) "complexity" measure (calculated by dividing number of aspects by degree of overlap) and wellbeing, controlling for stress. In each of these models, in what is now becoming a familiar pattern, we find no relationship with life satisfaction, but positive relationships with affect balance. The greater the complexity (measured either as H or as NASP/OL), the more positive the affect balance.

4.2.4 | Self-complexity measures and wellbeing: The take-home message

Taken together, there are three things to take from the analyses responding to our second guiding question. First, overlap did not function as we would expect, theoretically, and raises some questions about what has typically been measured in this space: similarity or compatibility? Second, we reported further perplexing findings on positivity, indicating that self-report evaluations of positivity were not necessarily the most useful way to approach this. Finally, using the traditional self-complexity measures yielded similar findings to the supergroup approach wherein we included selves not associated with a social group. This is an important step forward in integrating the two approaches.

4.3 | Quality assurance

Our final exploratory analyses were intended to shore up our findings, given the difficulty of self-reported research on the self and the global difficulty of conducting any social research during 2020. We found no evidence for considering social desirability in these analyses, despite the task consisting entirely of self-presentation. We also found very limited impact from the pandemic. As we anticipated that our participants were likely to be having a broad range of experiences of isolation, we collected a range of measures of activity, interaction with others and living situation, but found no clear pattern across isolation experience categories. This, in combination with our *a priori* plan to include perceived stress as a control in all models, lends credibility to our findings as representative of human experience, rather than simply a reflection of the strange social context of disease control measures.

4.4 | Limitations

There are, however, a range of limitations that must be borne in mind in interpreting our findings. First, and most obviously, in trying to integrate and compare two approaches, we have been forced to use a partial combination of measures from each, in order to avoid an hour-long, highly repetitive, self-contaminating study. While we seek to speak to the SIM approach, it is important that the reader note we have not used the SIM task and, instead, our participants have mapped their self-concepts using the Showers trait-sort (1995). This obviously raises some challenges in comparing our findings to the

literature and suggesting ways forward. The most proximal and useful future research that could be conducted here would be a comparative study that replicates the current work, but randomly assigns half of the participants to each self-map task (half to SIM, half to the trait-sort) to determine if the task has any clear effect on the analyses. While this is a limitation, it is also a strength. That we can demonstrate similar effects using a different self-mapping task speaks to the underlying theoretical value of considering the map of the self-concept and the relationships among the aspects of the self in modelling wellbeing.

Another limitation is our choice of wellbeing measures. While these mapped quite well onto some of the measures typically used in social identity and wellbeing literature, the self-complexity literature has typically engaged with more clinically oriented wellbeing measures, such as depression and anxiety inventories. Now that we have established some patterns for discussion, future research might consider a broader range of outcome measures, including those that capture mental ill-health, not just subjective wellbeing.

Finally, there is one notable operational limitation to consider. For practical reasons, while participants were given the instruction that they could list unlimited self-aspects, they were still confronted with the visual limitation of the number of available lines. While they could seek more lines by clicking a button, there remains an implied norm in the presence of 15 lines for self-aspect labels, which may have influenced the number of aspects participants reported and thus may limit the inferences we can draw about counts. However, we consider the SIM task to contain a similar limitation: while participants may produce as many groups as they desire, the mapping tool also carries an implied norm in the size of the canvas (whether online or paper) onto which the map is to be drawn. This, alongside the issue of instruction wording, needs to be carefully considered when designing interfaces for participants to self-report the number of selves or social groups.

4.5 | Implications

By providing a pre-registered and well-powered test of the association between self-concept structure and wellbeing, our study lends support to the recent formulation of the "social cure" model (Bentley et al., 2019): having a larger number of self-aspects is associated with better wellbeing, but only if those self-aspects meet the "supergroup" criteria. Further research may usefully focus on the relative importance of those criteria and perform sensitivity analyses, further validating the cut-off points that are currently used for classifying self-aspects into superaspects.

Our study also draws researchers' attention to the distinction between social collective, social non-collective, and personal aspects of the self-concept. The distinction between the first two often gets forgotten in social identity research, where we tend to conceptualise social identities as associated with social groups that have a clear membership. The issue of dyads is a case in point. While dyads are inherently social, they are not typically perceived as social groups; as our study showed, people listed dyadic relationships as "not associated with a social group". Future research may usefully explore this distinction, investigating whether any meaningful differences exist in how the collective and non-collective self-aspects contribute to health and wellbeing.

5 | CONCLUSION

The social identity approach to health and wellbeing is increasingly recognised as a valuable framework, both for theoretical work and for practical interventions. The self-complexity tradition, while theoretically compelling, has struggled to produce empirical support for its predictions. The current study provides some of the first pre-registered evidence of the relationships between self-structure and wellbeing, combining these two approaches and seeking to delineate the most useful aspects of both, in a large sample. Findings indicate some useful practical lessons. First, the supergroup model holds, even when not using the SIM task itself. Second, in looking at proximal, time-anchored wellbeing, there is clear scope to consider the inclusion of aspects of the self not associated with a social group, particularly if they are "super". Third, there are a number of measurement questions that remain open in this space, particularly with regard to similarity, positivity and the balance between self-report and quantitively measured attributes of the self-network.

ETHICS STATEMENT

The study protocol has been approved by the authors' institutional ethics review panels (University of Glasgow approval number 200190061, ANU approval number 2019/900).

CONFLICT OF INTEREST

Kasia Banas and Lillian Smyth declare that they have no conflict of interest.

DATA AVAILABILITY STATEMENT

Data openly available in a public repository that issues datasets with DOI: 10.17605/OSF.IO/ZT7AN.

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APPENDIX A

SELF COMPLEXITY INSTRUCTIONS

Please read the following instructions carefully.

Most people behave, think and feel differently depending on the social situation and the kinds of people who are around them. A set of behaviours, thoughts and feelings can be thought of as another version or "subtype" of the same person. For example, there might be you at work, you at home, you at university and you with your netball team.

In this study we are interested in these "subtypes" of a person. We would like you to think of as many different subtypes of yourself (at least one) that would describe who you are.

To help you with this, here are some ideas of areas in your life which you might use for this task:

1. Yourself engaging in different activities (e.g., jobs, sports, studies, hobbies, etc)
2. Yourself in your relationships with different people (e.g., with parents, siblings, extended family, close friends, romantic partners, patients, teachers, doctors or classmates)
3. Yourself in social groups (e.g., with friends, with supporters of your favourite sports team, with students in your field)
4. Yourself in different situations or places (e.g., alone, in social situations, with people you don't know, trying to give a good impression, in a crowd, at the hospital, at home, on holidays, at the beach)
5. The different ways in which you see yourself (e.g., extrovert, fashionista, partyer, academic, sporty)

These are simply some suggestions to get you thinking about the different versions or subtypes of yourself. Please do not feel limited by them.

In the boxes below, please list at least one, but as many as you need, subtypes of yourself, by giving each a brief label or description (e.g., "me at school", "me with my friends", "me doing art", "me as a brother", etc.).

When you cannot think of any more subtypes leave the remaining lines blank and click the forward arrow to move on.