The Rosenberg and the Rest: Meta-Research on the Measurement of Self-Esteem

in Personality and Social Psychology (2004-2015)

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Abstract

How has self-esteem been measured in personality and social psychology? We extracted measurement information from 338 articles published in twelve leading journals from 2004 to 2015. We report on the range of instruments used, the proportion of measurement occasions accounted for by each, longitudinal patterns in instrument use, and variable aspects of the measurement process. We had two primary findings: (1) the Rosenberg Self-Esteem Scale (Rosenberg, 1965) dominated the measurement of self-esteem and (2) there was considerable variability in the details of self-esteem measures (e.g., in response options, response anchors, stimuli and scoring algorithms). We critically discuss whether the RSES's domination of the measurement of self-esteem is a satisfactory state of affairs. We highlight the scale's largely unknown genesis as a Guttman-type scale, question its content validity for many popular definitions of self-esteem, and discuss its disputed dimensionality. We also examine the likely negative impact of flexible self-esteem measures and recommend researchers strive for greater measurement consistency in the future.

Keywords: self-esteem, measurement, meta-research, self-concept

The Rosenberg and the Rest: The Measurement of Self-Esteem in Personality and Social Psychology (2004-2015)

1. Introduction

Self-esteem is one of the most studied constructs in the history of psychology (e.g., MacDonald & Leary, 2012; Robins, Trzesniewski, & Donnellan, 2011; Zeigler-Hill, 2013) and the social sciences more generally (Bachman, O'Malley, Freedman-Doan, Trzesniewski, & Donnellan, 2011). Its popularity as a subject of inquiry continues. At the time of writing, a Web of Science search for articles published in 2018 with titles that contain the exact phrase “self-esteem” returns 480 articles. The specific question that guides the present meta-research, however, is, *how has self-esteem been measured in recent personality and social psychology?* This is an important question for at least three reasons.

First, by bridging the gap between the researcher and their target of inquiry, measures play an essential role in psychological research and theory (Furr, 2011; Reynolds, 2010; Simms, 2008). Scientific progress in psychology relies on the psychologist being able to validly measure the constructs he or she is interested in (e.g., Cattell, 1946; Clark & Watson, 1995; 2019; Fiske, 1971; Wylie, 1974; Nunnally & Bernstein, 1994). High quality measures should therefore be constructed and used in each area of psychological research—including on self-esteem. This goal will be more likely to be achieved when meta-research periodically provides an evidence base for critical reflection on measurement instruments and practices. Recent evidence on the frequent use of unvalidated and ad-hoc instruments in psychological research (Flake, Pek, & Hehman, 2017; Weidman, Streckler, & Tracy, 2017), and the flexibility of psychological measures (Elson, Rohangis, Johannes, Scharkow, & Quandt, 2014; Weinstein, 2017) highlights the importance of this kind of “bird’s eye view” work.

Second, past surveyors of research on self-esteem and the self-concept have arrived at pessimistic conclusions about its measurement. Wylie (1974) contended that, despite a

proliferation of measures in prior decades, “a really well-developed instrument has not appeared in the self-concept area” (p. 328) and many commonly used required considerable refinement. Later commentators more alarmingly described the measurement of self-esteem as “haphazard and inconclusive” (Demo, 1985, p. 1490) and even being in a state of “chaos” (Heatherton & Wyland, 2003, p. 221). Most recently, Leary (2006) observed that self-esteem researchers were using a variety of self-report measures interchangeably, despite little overlap in item content. This uncoordinated measurement approach, echoed by inconsistent experimental manipulations of self-esteem, he argued, had “created an impediment to theory, research and application” (p. 426). A comprehensive and fresh survey of the measurement landscape will help to determine whether the situation has improved.

Third, recent decades have seen the rise of “implicit” or “indirect” measures of self-esteem (e.g., Bosson, 2006; Bosson, Swann, & Pennebaker, 2000; Buhrmester, Blanton, & Swann, 2011; Oakes, Brown, & Cai, 2008; Perinelli, Alessandri, Donnellan, & Laguna, 2017) such as the Self-Esteem Implicit Association Test (SE-IAT: Greenwald & Farnham, 2000) and the Name Letter Test (NLT). To our knowledge, however, no one has yet investigated how frequently these instruments have been employed to measure self-esteem, relative to traditional self-report measures. Indeed, in a recent review, Donnellan, Trzesniewski, and Robins (2015) did not evaluate implicit measures due to their poor convergent and criterion validity (p. 113)—a pessimistic perspective on this class of instruments shared with others (e.g., Buhrmester et al., 2011; Falk & Heine, 2015; Falk, Heine, Takemura, Zhang, & Hsu, 2015; Perinelli, Alessandri, Donnellan, & Laguna, 2017). In view of these controversies, some quantification of their usage levels and methodological variations is important.

1.2. Previous Research

Previous research suggests that researchers predominantly assess self-esteem with the Rosenberg Self-Esteem Scale (Rosenberg, 1965). Most recently, Donnellan et al. (2015)

pooled Google Scholar citations, received between 2003 and 2013, for publications from which well-known self-esteem instruments originate. *Society and the Adolescent Self-Image* (Rosenberg, 1965)—the publication from which the Rosenberg Self-Esteem Scale first originates—accounted for 53%. This figure was by far the largest proportion accounted for by any instrument. This finding echoes the findings of earlier citation counts: *Society and the Adolescent Self-Image* accounted for the largest percentage (31%) of pooled citations of self-esteem instruments between 1991 and 2004 in the *SocialSciSearch* database (Kwan & Mandisodza, 2007), as well as the largest proportion of pooled citations (25%) between 1967 and 1991 in the *psycINFO* database (Blascovich & Tomaka, 1991).

However, despite its popularity, the citation count method (CCM) has a number of serious limitations. First, publications that include measures of self-esteem are often cited for reasons other than their use in research (Blascovich & Tomaka, 1991), which may inflate their apparent popularity. Second, for citations to be pooled, the meta-researcher must decide in advance which instruments researchers are using to measure self-esteem and to then identify a primary citation. This a priori approach is problematic because it limits the analysis to (a) instruments that the researcher is aware of, and (b) instruments that do indeed have primary citations (ad-hoc or impromptu measures do not). Third, CCM does not involve the direct observation of measurement practices. This means that it does not permit the investigation of any potentially interesting and consequential measurement details that vary from study-to-study. Given the many limitations of the CCM, we can draw only tentative and basic conclusions about the measurement of self-esteem in personality and social psychology from previous research.

Given the utility of knowing how self-esteem has been measured, and the shortcomings of previous research, we decided to carry out comprehensive exploratory meta-research on the measurement of self-esteem. We aimed to generate a detailed picture of the

construct's assessment in recent personality and social psychology by extracting measurement information from a comprehensive corpus of published research articles. We had four specific aims: (1) identify the full range of instruments used by researchers, (2) determine the proportion of measurement occasions accounted for by each instrument, (3) examine whether there have been any longitudinal changes in instrument usage, and (4) identify and provide information on variations in measurement procedure (e.g., number of response options and response anchors for self-report scales; different scoring algorithms for implicit instruments). The achievement of such aims would provide a solid and rich evidence base for critical reflection on how self-esteem has recently been measured in personality and social psychology.

2. Method

2.1. Eligibility Criteria, Search Terms, and Databases

We targeted all of the articles with titles containing the exact term “self-esteem”, published between January 2004 and December 2015, in a relevant online database of twelve prominent journals of personality and social psychology: (a) *Journal of Personality and Social Psychology*, (b) *Personality and Social Psychology Bulletin*, (c) *Self and Identity*, (d) *Journal of Research in Personality*, (e) *Journal of Experimental Social Psychology*, (f) *Personality and Individual Differences*, (g) *Journal of Personality*, (h) *Social and Personality Compass*, (i) *European Journal of Social Psychology*, (j) *European Journal of Personality*, (k) *Psychological Science*, and (l) *Social Psychological and Personality Science*. The search interface URL for each journal appears in Appendix A. All appendices, supplementary material, and data for this article are available at

https://osf.io/6wfvq/?view_only=226a91f75542475baef341d32765cb97.¹

¹ We did not preregister the present exploratory meta-research.

We targeted those journals because they are well known in the field of personality and social psychology for publishing research on self-esteem. Articles between 2004 and 2015 were targeted because, at the start of the project, the most recent research on the measurement of self-esteem covered a thirteen year period up to 2004 (Kwan & Mandisodza, 2007). Note, however, that this is no longer the case (see Donnellan et al., 2015).

2.2. Data Extraction

For each publication, we manually extracted information pertaining to (a) the number of studies where self-esteem was measured and (b) the instruments(s) used in each study to measure self-esteem. Importantly, in regards to (b), we identified the instruments(s) that had been used by the researcher with the *explicit intention* of measuring self-esteem, whether or not it had originally been constructed to assess it. Measures of trait, state, implicit, or explicit self-esteem and self-esteem stability were treated more broadly as measures of self-esteem. We did not treat translated versions of scales as separate instruments.

To capture variation in measurement details from study-to-study, as well as flexibility in measurement use, we recorded the number of response options and response anchors employed with self-report measures. For implicit measures, we also recorded the stimuli employed (i.e., category labels and categorized items for the IAT), the number of response options, the response format, and scoring algorithm. Although peripheral to our main aims, we recorded Cronbach's alphas (Cronbach, 1951), a statistic widely employed as an index of internal consistency reliability and/or internal consistency (Sijtsma, 2009; Streiner, 2003)² and other internal consistency reliability estimates provided for implicit measures.

² If the lowest and highest of a range of alphas were reported for a study, then both coefficients were recorded. The first coefficient was recorded when multiple alphas were reported at several time points in longitudinal research ($n = 30$). All coefficients were recorded when multiple alphas were reported pertaining to a number of subsamples of participants ($n = 40$).

3. Results

3.1. Retrieved and Excluded Articles

Our search initially retrieved 371 articles. Identification and exclusion decisions are depicted in Figure 1. We excluded articles concerned specifically with collective self-esteem ($n = 2$), performance self-esteem ($n = 1$), organisation-based self-esteem ($n = 1$), and academic self-esteem ($n = 1$), on the grounds that these were overly specific. We also discounted articles that we deemed a priori unlikely to contain novel measurement occasions in basic research: meta-analyses ($n = 4$); reply articles ($n = 1$); narrative literature review articles ($n = 7$); reanalyses of previously published data ($n = 1$); and psychometric articles that involved the analysis of the properties of existing measures of self-esteem ($n = 13$) or the introduction of a new measure of self-esteem ($n = 2$)³. Thus, a total of 338 articles were retained for analysis. References for all articles appear in Appendix B.

3.2. General Statistics

Figure 1 shows that self-esteem was assessed in 329 of the 338 included articles (97.34%)⁴ and in 585 individual studies. Overall, self-esteem was measured on a total of 769 occasions—a larger number than separate studies that reflects the common practice of measuring self-esteem with more than one instrument. Measurement details for each study—

³ Psychometric investigations (e.g., confirmatory factor analyses), as well as papers that documented the construction and initial validation of a new instrument, were excluded because they involved the critical investigation of measures of self-esteem, rather than the use of those measures in empirical research as measures of self-esteem *per se*.

⁴ The nine articles in which self-esteem was not measured consisted of (a) five on contingencies of self-esteem, (b) one on perceptions of other people's self-esteem, (c) one on threats to self-esteem, (d) one on the desire for self-esteem, and, finally, (e) one on motives other than self-esteem in identity construction.

the instrument(s) used, number of response options, response anchors, and reported Cronbach's alpha—are tabled in Appendix C. Further details on implicit measures can be found in Table 1 of Appendix D (for the NLT) and Table 2 of Appendix D (for the SE-IAT). See Appendix E for further information on custom measures.

3.3. Overall Measure Use

Researchers used twenty-nine different instruments to assess self-esteem. Table 1 shows the number and percentage of measurement occasions accounted for by each type of instrument. Researchers employed the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965) on more than half of measurement occasions (55.93%). Next came custom instruments, the Self-Esteem Implicit Association Test (SE-IAT; Greenwald & Farnham, 2000), the Name Letter Test (NLT), and the modified-for-states Rosenberg Self-Esteem Scale (RSES-MFS; Rosenberg, 1965), each accounting for between 5% and 10% of measurement occasions. The remaining instruments appearing in the top ten—namely, the State Self-Esteem Scale (SSES; Heatherton & Polivy, 1991), the Single Item Self-Esteem Scale (SISE; Robins, Hendin, & Trzesniewski, 2001), the shortened Rosenberg Self-Esteem Scales (RSES-S; Rosenberg, 1965), the Single-Item Name Liking measure (SINL; Gebauer, Riketta, Broemer, & Maio, 2008), and finally the Self-Liking and Self-Competence Scales (SLSC; Tafarodi & Swann, 1995; Tafarodi & Swann, 2001)—accounted for less than 5% of measurement occasions ($M = 2.21\%$). Altogether, the ten leading types of instruments accounted for the majority of measurement occasions ($n = 729, 94.80\%$).

3.4. Trends Over Time

Figure 2 shows the percentage of measurement occasions accounted for by each of the ten most used measures of self-esteem for the twelve years from 2004 through 2015. The RSES dominated in each year and accounted for fewer than half of measurement occasions in only two years (2004 and 2007). In three years (2005, 2010, and 2014) the figure rose as high

as two-thirds. In contrast, instruments other than the RSES rarely came to prominence. Even “runner-up” custom measures accounted for over 15% of the measurement occasions in only two years (2004 and 2008). The NLT (in 2004 and 2006), the SE-IAT (in 2012 and 2013), and custom measures (in 2005, 2007, 2013, and 2015) accounted for between 10 and 15% of measurement occasions on a handful of occasions.

3.5. The Ten Most Used Measures: Descriptions and Measurement Details

3.5.1. Rosenberg Self-Esteem Scale ($n = 430$, 55.92%). The RSES is a self-report scale comprising the ten items of the self-esteem scale that appear in Rosenberg (1965) (see also Blascovich & Tomaka, 1991; Donnellan et al., 2015). After reverse-scoring negatively phrased items, responses are aggregated (either summed or averaged) to provide a self-esteem score, with higher scores indicating higher levels of self-esteem.

The RSES originally had four response options (Rosenberg, 1965, p. 305-307) with the following response anchors: 1 (*strongly agree*), 2 (*agree*), 3 (*disagree*), and 4 (*strongly disagree*). Table 2 shows that researchers preferred four response options, likely reflecting deference to the original version of the RSES. Thereafter, versions with greater numbers of scale points were decreasingly common, with the qualification that even-numbered scales tended to be avoided.

Table 3 shows the 18 different response anchor combinations that were employed with the RSES. By far the most common combination, accounting for nearly three quarters of measurement occasions, was *strongly disagree* to *strongly agree* ($n = 165$, 73.66%). The next most common combinations were *very strongly disagree* to *very strongly agree* ($n = 8$, 3.57%) and *strongly agree* to *strongly disagree* ($n = 8$, 3.57%)—the original response anchors used with the scale (Rosenberg, 1965, p. 305-307).

Overall, researchers employed 35 different response option number/response anchor combinations (where both were reported: $n = 214$, 49.77%). The most common combination

was four response options and *strongly disagree* to *strongly agree* ($n = 63$, 29.44%); second, was five response options and *strongly disagree* to *strongly agree* ($n = 59$, 27.57%); and third, was seven response options and *strongly disagree* to *strongly agree* ($n = 26$, 12.15%). Thus, together, where researchers reported both pieces of information, the three most common combinations accounted for over two-thirds of RSES measurement occasions.

3.5.2. Custom ($n = 76$, 9.88%). We classified as custom or ad hoc (Furr, 2011) those self-report scales—other than the Rosenberg Self-Esteem Scale modified for states (see below) or the shortened Rosenberg Self-Esteem Scale (see below)—that (a) sometimes mixed items or procedures from specific measures of self-esteem, but (b) did not have primary citations, and/or that (c) were not known to have been the subject of a systematic validation process in that specific form.

Detailed information for all custom measures can be found in Appendix E. We could identify, broadly speaking, four types of custom measures. First, some featured items that enquired into self-related feelings or affect, an example being the single item “Overall, how good or bad do you *feel* about yourself?” Second, some featured items assessing overall or general self-evaluations, examples being the single items “In general, I have a positive opinion of myself” and “In general, I like myself”. Third, some instruments comprised a selection of the bipolar adjective rating scales drawn from McFarland and Ross (1982) (e.g., “accepted-rejected”, “unimportant-important”). Fourth, some scales mixed item subsets from miscellaneous scales, or adapted items from a frequently used scale, an example being a hybrid of items from the RSES (see above) and the performance and social subscales of the SSES (see below).

The vast majority of custom instruments ($n = 74$, 84.21%) were multi-item self-report scales. On average, they featured fewer items than the RSES ($M = 7.67$, $Mdn = 5$, $SD = 8.13$, range = 1-42). Table 2 shows that researchers preferred five and seven point response

formats. Table 3 shows that custom scales featured eighteen different response anchor combinations—the same number employed with the RSES. The response anchors most frequently used by researchers were *not at all* to *very much* ($n = 14$, 29.79%), *not at all* to *extremely* ($n = 7$, 14.89%) and *strongly disagree* to *strongly agree* ($n = 5$, 10.64%).

3.5.3. Self-Esteem Implicit Association Test ($n = 53$, 6.89%). The SE-IAT is a version of the Implicit Association Test, pioneered by Greenwald and Farnham (2000, p. 1024). In essence, the SE-IAT is a speeded binary sorting task (Gregg & Klymowsky, 2013). It originally consisted, and canonically still consists, of seven blocks of trials, comprising five practice blocks and two crucial test blocks. In the SE-IAT, the “compatible” test block (i.e., reflecting more “automatic” pairings, indicative of higher self-esteem) has respondents press one key whenever either a self-related or positive word appears (e.g., *me*, *joy*), and another key whenever either a non-self-related or negative word appears (e.g., *them*, *vomit*). In contrast, the “incompatible” test block (i.e., reflecting less “automatic” pairings, indicative of lower self-esteem) has respondents press one key whenever either self-related or negative words appear, and another key whenever either non-self-related or positive words appear. In both blocks, respondents are instructed to proceed as quickly as possible without making errors. The greater the positive difference in average response latencies between “compatible” and “incompatible” blocks—that is, the easier it was for respondents to associate themselves (rather than some contrasting category) with positive (rather than with negative labels)—the higher the participants implicit self-esteem is considered to be. However, as Appendix D documents, beyond these commonalities SE-IATs differed in notable ways.

First, several different algorithms were used to process SE-IAT data (like IAT data in general; Greenwald, Poehlman, Uhlmann, & Banaji, 2009). About a fifth of the time, a simple difference score, derived from averaged trial latencies per block, served as the index

($n = 10$, 18.87%). In one case (1.89%) latencies were additionally log-transformed beforehand to contain skewness. About half the time researchers used versions of an improved “*D*-algorithm” devised by Greenwald et al. (2003). Its purpose is to help control for individual differences in response speed known to confound IAT effects. To achieve this, the *D*-algorithm divides the difference score by the so-called “pooled standard deviation”—computed across all critical latencies without regard for the block from which they derive. The *D*-algorithm comes in slight variants, which differ on additional issues, such as how to deal with classification errors. Statistics were as follows: Original *D* procedure ($n = 11$: 18.87%); D_1 procedure ($n = 5$, 9.43%); D_2 procedure ($n = 4$, 7.55%); D_4 procedure ($n = 2$, 3.77%), a mixture of *D* procedures ($n = 2$, 5.66%), and a procedure reported only as “based on *D*” ($n = 1$, 1.89%). Finally, different scoring procedures for a paper-and-pencil SE-IAT were applied one occasion (1.89%). Note, however, that in almost a third of cases ($n = 16$, 30.19%), researchers did not provide enough information to determine the scoring method they had used.

In addition to scoring procedures, researchers used various category labels to represent the target concepts. On just under a third of occasions (18), labels contrasted a “self” category against an “other” category: *Self* and *Other* ($n = 12$, 27.91%); *Self* and *Others* ($n = 4$, 9.30%); *I* and *Other* ($n = 1$, 1.89%), and *Me* and *Others* ($n = 1$, 1.89%). About a quarter of the time ($n = 14$, 26.42%), labels contrasted a “self” category against some negation of the self-category: *Self* and *Not-Self* ($n = 6$, 11.32%) *Me* and *Not-Me* ($n = 6$, 11.32%—as in Greenwald & Farnham, 2000; Figure 1)—*I am* and *I am not* ($n = 1$, 1.89%), and *Self-related* and *Non self-related* ($n = 1$, 1.89%). On a few other occasions, the labels *Self* and *Object* were employed ($n = 4$, 7.55%). Lastly, the single category *Self* was employed with a single-category IAT on 2 occasions (3.77%). Researchers provided insufficient information to determine concept labels on the remaining ten occasions (18.86%).

Category labels for attributes varied less. On nearly half of measurement occasions, researchers used *Pleasant* and *Unpleasant* ($n = 24$, 45.28%, as in Greenwald & Farnham, 2000; Figure 1). On a handful of occasions, they used alternatives: *Positive* and *Negative* ($n = 9$, 16.98%) and *Good* and *Bad* ($n = 2$, 3.77%). Insufficient information was provided to determine attribute labels on 17 occasions (32.07%).

Lastly, researchers used a miscellany of positive and negative items. Table 4 shows that 71 different positive items (e.g., *active*, *cheerful*, *excellent*) were reported across the SE-IAT studies. Just 14 of these appeared in the original SE-IATs designed by Greenwald and Farnham (2000, p. 1038). In addition, a total of 67 negative items were reported (e.g., *agony*, *bomb*, *cockroach*). Similarly, just 17 of these appeared in the original SE-IATs designed by Greenwald and Farnham (2000, p. 1038). However, target concept stimuli varied less. Researchers employed a total of 14 different self-related stimuli (e.g., *me*, *my*, *I*) and 28 non-self-related stimuli (e.g., *they*, *them*, *others*). Among the former, half of the stimuli were idiographic (e.g., items specific to the participant: the participant's first name, last name, or birth place). Among the latter, less than a third of stimuli were idiographic (e.g., other's first name, last name, city of residence). Yet, researchers often did not report SE-IAT items: negative ($n = 22$, 41.51%), positive ($n = 18$, 33.96%), self items ($n = 17$, 32.07%), and non-self-related ($n = 21$, 39.62%).

3.5.4. Name-Letter Test ($n = 43$, 5.59%). The NLT is based on the *name letter effect*. This is the tendency for people to prefer those letters of the alphabet in their own name—a phenomenon first identified by Jozef Nuttin (1985) (for an historical overview of research on this phenomenon, see Hoorens, 2014). To our knowledge, the NLT was first suggested as an index of “implicit” self-esteem by Greenwald and Banaji (1995, p. 12; see also Albers, Rotteveel, & Dijksterhuis, 2009; Stieger, Voracek, & Formann, 2012). In modern versions of the NLT, participants are required to rate each letter of the alphabet for

how much it appeals to them (as opposed to selecting some letters over others). In general, the more positively an individual rates the letters in their own name—after controlling for one or more confounds—the higher their “implicit” self-esteem is deemed to be. However, in practice, the NLT overwhelmingly takes the form of the Initial Preferences Task (IPT), where only ratings for those letters are compared to alternatives. Indeed, here, focal letters were both initials on 38 occasions (88.37%), all name letters on 3 occasions (6.98%), and first-name initial on 1 occasion (2.33%). Not enough information was provided to determine this measurement detail on 1 occasion (2.33%).

As with the IAT, scoring algorithms for the NLT vary across studies (see LeBel & Gawronski, 2009, for a review of these algorithms). This reflects the fact that liking for key name letters can be reasonably compared either to liking for non-name letters (a “self-corrected algorithm”), or to general liking for those letters in the population (a “baseline correct algorithm”), or to both (a “double-correction algorithm”). Additionally, one can try to control for respondents’ own evaluative response biases either by computing the difference between ratings of the initials and non-initials in one’s name (an “ipsatized double-correction algorithm”), or by standardizing all ratings within each respondent (a “z-transformed double-correction algorithm”). Further complicating the picture, any of the former three algorithms can be combined in principle with either of the latter two.

The researchers we studied applied five algorithms. The baseline-corrected algorithm was by far the most common ($n = 29$, 67.44%). Next came the ipsatized double-correction algorithm ($n = 4$, 9.30%), followed by the self-corrected algorithm ($n = 2$, 4.65%) and the z-transformed-double-correction algorithm ($n = 1$, 2.33%) (see LeBel & Gawronski, 2009, for further details of these scoring procedures). An additional simpler scoring procedure, consisting of mean z-scores for name letters, was applied on one occasion (2.33%). On a

further six occasions (13.95%), not enough information was provided to determine the algorithm applied.

Evaluational instructions also varied (as noted by Sakellaropoulo and Baldwin, 2007, and Stieger et al., 2012). Participants rated the extent to which they *liked* the letters over half the time ($n = 23$, 53.49%); but they also rated how *beautiful* ($n = 8$, 18.60%), *attractive* ($n = 3$, 6.98%), *beautiful* and *attractive* ($n = 3$, 6.98%), and *nice* ($n = 1$, 2.33%) they were. On five occasions (11.63%) insufficient information was provided to determine the instructions given. The number of response options for rating scales varied too, with large numbers predominating: five ($n = 5$, 11.63%), six ($n = 1$, 2.33%), seven ($n = 16$, 37.21%), and nine ($n = 11$, 25.58%). Researchers provided insufficient information to determine the number of response options on ten occasions (18.87%).

3.5.5. Modified-for-States Rosenberg Self-Esteem Scale ($n = 42$, 5.46%). The RSES-MFS is a self-report scale that typically features modified versions of the items of the self-esteem scale that appear in Rosenberg (1965). Items appear with either the clause “right now” or “at this present moment” attached (e.g., “Right now, I feel that I am a person of worth, at least on an equal plane with others”, “At this present moment, I take a positive attitude toward myself”). Alternatively, participants are asked to rate each item in relation to “how they feel about themselves today”. Table 2 shows that researchers overwhelmingly preferred ten or more response options with the RSES-MFS (69.70%), and oddly large number, perhaps chosen to help maximize sensitivity—albeit optimistically (Simms, Zelazny, Williams, & Bernstein, 2019). Table 3 shows that the RSES-MFS was almost exclusively used with a *strongly disagree* to *strongly agree* response anchor format ($n = 28$, 93.33%).

3.5.6. State Self-Esteem Scale ($n = 31$, 4.03%). The SSES (Heatherton & Polivy, 1991) is a 20-item self-report scale (p. 898), the content of which is based on two earlier self-esteem scales (Heatherton & Polivy, 1991, p. 897). The scale comprises seven items intended

to assess *performance* self-esteem (e.g., “I feel confident about my abilities”), six intended to assess *appearance* self-esteem (e.g., “I feel satisfied with the way my body looks right now”), and seven intended to assess *social* self-esteem (e.g., “I am worried about whether I am regarded as a success or failure”). Separate performance, appearance, and social self-esteem scores are calculated by reverse-scoring the negatively-phrased items, and then averaging responses to the items pertaining to each type of self-esteem. A total self-esteem can be taken by averaging all item responses after reverse-scoring.

The SSES originally featured five response options (Heatherton & Polivy, 1991, p. 897), with the following response anchors: 1 (*not at all*), 2 (*a little bit*), 3 (*somewhat*), 4 (*very much*), 5 (*extremely*). Table 2 shows that researchers preferred five response options in the present survey ($n = 18$, 72.00%). As Table 3 shows, the original response anchors were the most commonly employed ($n = 8$, 44.44%), but five other response anchor combinations were used including *strongly disagree* to *strongly agree* ($n = 3$, 16.67%) and *completely false* to *completely true* ($n = 3$, 16.67%).

3.5.7. Single-Item Self-Esteem Scale ($n = 20$, 2.60%). The SISE (Robins et al., 2001) requires participants to indicate on a scale from 1 (*not very true of me*) to 5 (*very true of me*) the extent to which they agree with the statement “I have high self-esteem”. Table 2 shows that the scale was used primarily with the original 5 response options (68.43%). Table 3, however, shows that researchers most frequently used the SISE with *strongly disagree* to *strongly agree* response anchors ($n = 10$, 52.63%)—much more so than with the original format ($n = 3$, 15.78%).

3.5.8. Shortened Rosenberg Self-Esteem Scale ($n = 19$, 2.47%). The RSES-S is any self-report measure that uses some of the items of the RSES. Abbreviated versions of the RSES have been used for several decades (Robins et al., 2001). The number of items abstracted from the original RSES ranged from one to nine ($M = 5.11$, $Mdn = 4$). Table 2

shows that four and five response options were preferred. Table 3 shows that the RSES-S was most often used with *strongly disagree* to *strongly agree* response anchors ($n = 8$, 57.14%), but six other response anchor combinations were employed including *very inaccurate* to *very accurate*, and *extremely uncharacteristic of me* to *extremely characteristic of me* (both $n = 1$, 7.14%).

3.5.9. The Single Item Name-Liking measure ($n = 8$, 1.04%). The SINL (Gebauer et al., 2008) is the newest measure to appear in the top ten. It might be considered as a hybrid of the “explicit” SISE and “implicit” NLT. Participants respond to the question “How much do you like your name, in total?” on a scale from 1 (*not at all*) to 9 (*very much*). Researchers used the SINL with a 9-point scale on all occasions.

3.5.10. Self-Liking and Self-Competence Scales ($n = 7$, 0.91%). “SLSC” refers both to the original (Tafarodi & Swann, 1995) and revised (Tafarodi & Swann, 2001) Self-Liking and Self-Competence Scales. The original version consists of twenty items designed to assess a two distinct dimensions of self-esteem (each with 10 items). The first dimension is *self-liking*, defined as “our affective judgement of ourselves, our approval and disapproval of ourselves, in line with internalized social values” (Tafarodi & Milne, 1995, p. 325). Items such as “I like myself” and “I feel comfortable about myself” capture this. The second dimension is self-competence, defined as “the overall sense of oneself as capable, effective and in control” (Tafarodi & Milne, 1995, p. 325). Items such as “I perform very well at a number of things” and “I am a capable person” capture this. The revised version contains 16 items. Four are drawn verbatim from the original scale. A further seven are reworded. In both versions, after the reverse-scoring of negatively-phrased statements, the items of each subscale are averaged to provide indices of self-liking and self-competence. Higher scores represent higher levels of each.

The scales originally featured 5-point response formats (Tafarodi & Swann, 1995, p. 327; Tafarodi & Swann, 2001, p. 658), with *strongly disagree* to *strongly agree* response anchors. As Table 2 shows, researchers exclusively used the SLSC with five response options on all of the occasions that response options were reported. Table 3 shows that the original response anchors were employed on the one occasion that response anchors for the SLSC were reported.

3.6. Cronbach's Alphas for Multi-Item Self-Report Scales

At least one Cronbach's alpha was reported on 465 of the 617 (75.36%) occasions that a multi-item self-report scale was used. The mean Cronbach's alpha reported across all measures ($N = 515$) was .86 ($SD = .06$, $Mdn = .87$, range .52 - .96). The distribution of alphas for the five most commonly used multi-item self-report scales are reported in Table 2 and displayed in boxplots in Figure 3. With the exception of the RSES-S, mean coefficients for all other scales met Nunnally and Bernstein's (1994, p. 265) rule of thumb for basic research ($>.80$), which has more recently been endorsed by Furr (2011). They also exceeded the mean coefficient of $\alpha = .79$ reported in a sample of articles appearing in *Journal of Personality and Social Psychology* in 2015 ($SD = .13$, range = .18 - .87; Flake, Pek, & Hehman, 2017). Across all scales, more than eighty percent of reported Cronbach's alphas were greater than .80 ($n = 435$, 84.47%) and more than ninety-five percent were greater than .70 ($n = 495$, 96.12%).

Figure 4 displays the distribution of Cronbach's alphas by number of response options for all self-report scales (top panel) and for the RSES (bottom panel). Median Cronbach's alpha was not strongly correlated with the number of response options, for all scales or specifically the RSES; although there was a small positive correlation between the number of response options and alpha ($r = .12$).

3.7. Internal Consistency Reliability of Implicit Measures

The distribution of reliability estimates for the SE-IAT and NLT is presented in Figure 5. Average reliability coefficients for implicit measures were lower than multi-item self-report scales. The internal consistency reliability of the SE-IAT was assessed in three ways (see Appendix D): as a Spearman-Brown adjusted split-half correlation on ten occasions ($M = .67$, $Mdn = .68$, $SD = .09$, range = .49 - .76); as an unadjusted split-half correlation on seven occasions ($M = .62$, $Mdn = .61$, $SD = .07$, range = .55 - .76); and as a Cronbach's alpha on nine occasions ($M = .77$, $Mdn = .72$, $SD = .12$, range = .63 - .98). No estimate of internal consistency was provided on 27 occasions (50.94%).

The internal consistency reliability of the NLT was assessed in two ways (see Appendix D). First, reported on eight occasions, was a correlation between rating of the first name initial and the last name initial ($M = .46$, $Mdn = .47$, $SD = .14$, range = .28 - .68) (as in Bosson, Swann, & Pennebaker, 2000, p. 635). Second, reported on nine occasions, was a Cronbach's alpha ($M = .58$, $Mdn = .58$, $SD = .13$, range = .41 - .84). In addition, five test-retest reliability correlations were reported: one for both initials ($r = .60$), two for first-name initials ($r_s = .82$ & $.71$), and two for last-name initials ($r_s = .77$ & $.55$). Just over half the time ($n = 23$, 53%), neither internal consistency reliability nor test-retest reliability information were provided.

4. Discussion

We extracted measurement information from 328 articles on self-esteem published in leading journals of personality and social psychology. Our meta-research points to two noteworthy conclusions about the measurement of self-esteem in personality and social psychology across this time period. First, the RSES consistently dominated all competing measuring instruments, with custom measures finishing only a distant second, followed by two implicit measures. Second, there was substantial variability across the finer details of

measurement (e.g., response options, response anchors, stimulus semantics, and scoring algorithms) that often seemed arbitrary.

4.1. The RSES Consistently Dominated

Although Heatherton and Wyland (2003) described the measurement of self-esteem up to the date of their review as “chaos”, this is arguably not what we found here – at least in terms of instrument use. In contrast, as Table 1 shows, only a handful of instruments (ten) accounted for the vast majority of measurement occasions. The most salient finding, however, echoing earlier findings based on less definitive methodologies, was that the RSES perennially dominated the measurement of self-esteem. Overall, the ten-item scale accounted for well over half of all measurement occasions—several times as much as its nearest “competitor”. Importantly, if one were to add shortened and modified versions of the RSES to the total, the composite figure would approach an impressive two-thirds of measurement occasions. Moreover, if it shows any trend, Figure 2 shows that the relative popularity of RSES might be increasing.

Why did the Rosenberg dominate? Perhaps the main reason is that it enjoys a *sterling reputation*. It has been described as the “gold standard” instrument (Bleidorn, Arslan, Denissen, Rentfrow, Gebauer, & Gosling, 2015, p. 4; Gebauer, Sedikides, Wagner, Bleidorn, Rentfrow, Potter, & Gosling, 2015, p. 530), as “the standard by which new measures are evaluated” (Blascovich & Tomaka, 1991, p. 123), and as having “excellent” psychometric properties “despite it being brief and easy to administer” (Koestner & Mageau, 2006, p. 96). Moreover, it is said to be “highly reliable” (Baldwin, Bacchus, & Fitzsimmons, 2004, p. 84), to have “shown high reliability and good validity” (Benetti & Kambouropolous, 2006, p. 345), or even “excellent reliability and validity” (Ciarrochi, Heaven, & Davies, 2007, p. 1166), and to be “a widely used, reliable and valid measure” (Bos, Huijding, Muris, Vogel, & Biesheuvel, 2010, p. 312). The measure has also fared reasonably well in otherwise critical

reviews of methodology in self-concept and self-esteem research (e.g., Wells and Marwell, 1976, p. 194; Wylie, 1974, p. 180-190; Baumeister, Campbell, Krueger, & Vohs, 2003, p. 5). Indeed, it has been accorded the accolade of being “*The Self-Esteem Scale*” (Kwan & Mandisodza, 2007, p. 265, emphasis added).

Is the RSES’s domination of the measurement of self-esteem a satisfactory state of affairs? If it is the case that whatever the RSES assesses maps on faithfully to what researchers collectively and habitually mean by self-esteem, then it would seem so. However, the the validity of the RSES is a complex and even fraught issue, requiring extensive treatment. Its validity depends on researchers definitions of self-esteem (i.e., what she or he “means by” self-esteem), the convoluted history of the RSES, and synthesis of the extensive psychometric literature on the scale. In the limited space available to us here, we address three important issues that researchers who use RSES should be aware of.

First, the 50-year-old RSES was initially constructed and validated as a Guttman scale (see Rosenberg, 1965, p. 16-18 & 305-307). Briefly, a Guttman scale by design organises its items into a hierarchy, rather than construing each item as an interchangeable indicator of some underlying construct (Guttman, 1944; McIver & Carmines, 1981). Accordingly, different scale items differentially represent a construct of interest—with some being “weaker” or “stronger” than others. A respondent’s score can thus be determined by the “strongest” item, or item set, that they endorse. As a result, Rosenberg did not intend to select items that, aside from measurement error, interchangeably represented a single underlying construct—as researchers standardly intend in contemporary psychometrics (Bollen & Bauldry, 2011).

To illustrate this point, imagine a researcher is interested in constructing a Guttman scale that assesses an individual’s desire for the UK to withdraw from the European Union. To do so, she would create items that varied in the extent to which they represented her

chosen target of inquiry. For example, she might propose a weak item (Item A) “I am not sure, but I think I support Brexit”, a middling item (Item B) “I am keen on Brexit”, and a strong item (Item C) “There is nothing I would like more than Brexit”. In a Guttman scale, the expectation is that when respondents agree with any “strong” item, they will agree with all weaker items too. Thus, in our hypothetical example, respondents who endorse Item C will agree with Item B and Item A, but respondents who do not agree with Item A or Item B should not agree with Item C. In this hypothetical 3-item scale, participants would be assigned a score of 0, 1, 2, or 3—with higher scores representing greater desire for Brexit. A score of 0 would represent disagreement with all three items; a score of 1, agreement with (weak) Item A; a score of 2, agreement with (intermediate) Item B too; and a score of 3, agreement with (strong) Item C also. Each respondent would be assigned the score that corresponds to the strongest item they endorse, and their responses to weaker items discarded.

This is how it was with the original RSES: the respondent’s score—always a whole number—was determined by the most extreme items they selected between “I am a person of worth, at least on equal plane as others” (the strongest item) and “I certainly feel useless at times” (the weakest item). As an aside, complicating the picture a little further, Rosenberg bundled some items together with others; but the details need not detain us. There is no evidence here that the RSES is being used in this way in modern personality and social psychology. Moreover, the original responses options for the scale (1) “strongly agree”, (2) “agree”, (3) “disagree”, or (4) “strongly disagree” were used on only a fraction of measurement occasions ($n = 8$, 3.57%), with a flipped around “strongly disagree” to “strongly agree” response anchor combination dominant ($n = 165$, 73.66%). Arguably, the modern form of the RSES is therefore a modified or impromptu measure and citing Rosenberg (1965) for a ten-item Likert-type scale is inappropriate.

Second, researchers define self-esteem in many different ways. These include: an individual's overall evaluation of their worth or value; generalised good or bad self-feelings; the positivity of one's self-attitude; beliefs about self-worth and competency; an overall evaluation of the self; self-liking or acceptance; or the positivity of a many of self-evaluations (Blascovich & Tomaka, 1991; Branden, 2006; Brown, Dutton, & Cook, 2001; Brown & Marshall, 2006; California State Department of Education, 1990; Leary, 2006; Mruk, 2013; Pegler, Gregg, & Hart, 2018; Sowislo & Orth, 2013). It seems unlikely that the RSES, or any single instrument, would capture each definition of self-esteem equally well.

The conceptualisation that guided the construction of the RSES was quite broad. Rosenberg took as his "point of departure the view that people have attitudes toward objects, and that the self is one of the objects toward which one has attitudes" (Rosenberg, 1965, p. 5). In a chapter entitled *Definition and Measurement*, he reiterates: "self-esteem, as noted, is a positive or negative attitude toward a particular object, namely, the self". Or again: "while the reader may question one or another item", Rosenberg states, "there is little doubt that the items generally deal with a favourable or unfavourable attitude toward the self" (p. 18). He later adds: "high self-esteem, as reflected in our scale items, expresses the feeling that one is 'good enough'. The individual simply feels that he is a person of worth; he respects himself for what he is, but he does not stand in awe of himself nor does he expect others to stand in awe of him. He does not necessarily consider himself superior to others" (p. 30). In contrast, "low self-esteem, on the other hand, implies self-rejection, self-dissatisfaction, self-contempt. The individual lacks respect for the self he observes" (p. 31).

Recent research shows that the self-worth/value definition, that self-esteem is an individual's overall evaluation of their worth or value, is by far the most popular (Pegler et al., 2018); but it is clear from these passages that the RSES was intended to assess something broader. This intent is reflected in the heterogeneous content of the ten items of the RSES.

They not only inquire about whether an individual believes they are “a person of worth”, but also whether they are “useless”, a “failure”, “able to do things as well as other people”, have “much to be proud of”. Note that the latter four items assess specific competency beliefs rather than overall worth or value. Other items refer to having a “favorable attitude towards oneself”, to being “satisfied” with oneself, or to feeling “at times” that one is “no good at all”. Such language reflects an overall attitudinal definition, with some temporal qualifications. Yet other items refer to a lack of “respect” for self (a specific reaction, different from a lack of liking), or to having a “number of good qualities” (which looks at piecemeal self-beliefs). Given the demonstrated diversity that characterises definitions of self-esteem (Pegler et al., 2018), and Rosenberg’s broad definition of self-esteem, we encourage researchers not to assume that the popular RSES assesses self-esteem *as they define it*. Researchers should be mindful that the RSES casts a relatively wide and inclusive net, rather than a narrow and specific one. For example, suppose that a researcher were to construe to self-esteem as intrinsically affective. If so, then one might better opt for the recently developed Lifespan Self-Esteem Scale (LSES; Harris, Donnellan, & Trzesniewski, 2018, which not only features, like the RSES, the term “feel” in its constituent items (where its meaning is ambiguous, and a potential synonym for “think”), but also explicitly labels the response options in terms of different degrees of “sad” or “happy”, and uses corresponding emoji-like faces instead of numbered options.

Third, and relatedly, researchers should be aware that there is an ongoing debate over the RSES’s factor structure and dimensionality (Alessandri, Vechionne, Eisenberg, & Laguna, 2015; Donnellan, Ackerman, & Brecheen, 2016; Ervin & Stryker, 2001; Marsh, Scalas, & Nagengast, 2010). The flashpoint for this debate appears to have been the scale’s poor performance in factor-analytic investigations. Exploratory factor analyses — or the related technique of principal components analyses — typically find two factors with

eigenvalues greater than 1 (Donnellan et al., 2016; Kaplan & Pokorny, 1969; McIver & Carmines, 1981; see Huang & Dong, 2012 for a meta-analysis), or that only a relatively small proportion of variance is accounted for by a first factor (Schmitt & Allik, 2005). Researchers have recurrently found that while positively-worded items have high factor loadings on the first factor, negatively-worded items have high factor loadings on the second factor. In addition, confirmatory factor analyses typically find that the single factor uncorrelated error model—the unidimensional model in structural equation modelling (Hopwood & Donnellan, 2010; Kline, 2011; Reise, 2012)—fits poorly. These findings are hardly surprising given that the RSES, developed as a Guttman scale, was never intended to meet best-practice factor analytic criteria in psychometrics; was developed two years before the advent of confirmatory factor analysis (Joreskog, 1967); and was underpinned by a broad definition of self-esteem.

Although a number of researchers have interpreted these results as stemming relatively unproblematically from a “method effect”, no fewer than four theories on the multidimensionality of the RSES exist. First, inspired by Owens’ (1993; 1994) distinction, a number of researchers have theorised that positively-worded items assess “positive self-esteem” and negatively-worded items assess “negative self-esteem” (e.g., Andrews & Brown, 1993; Ang, Neubronner, Oh, & Leong, 2006; Boduszek, Hyland, Dhingra, & Mallet, 2013; Boduszek, Shevlin, Mallett, Hyland, & O’Kane, 2012). Second, Tafarodi and colleagues (e.g., Tafarodi & Milne, 2002; Tafarodi & Swann, 1995; Tafarodi & Swann, 2001) have argued that the RSES taps two distinct but related forms of personal value, specifically, self-liking and self-competence (see also Richardson, Ratner, & Zumbo, 2009). Third, other researchers posit that the RSES assesses both “general evaluation” and “transient evaluation” (Kaufmann, Rasinski, Lee, & West, 1991), with items nine and ten—those items containing the qualifiers “at times”—indicators of the latter. Fourth, and lastly, different researchers have contended that the scale assesses both “self-competency” and “self-derogation”

(Alessandri et al., 2015). Researchers should be mindful of these multidimensional theories and their implications for research. For example, if Tafarodi et al.'s and Alessandri et al.'s contention that the RSES assesses self-competency has any truth to it, it would seem that employing the RSES as a measure of self-esteem in research on the interplay between self-esteem and self-competency beliefs would risk measuring the same thing twice.

Despite the dominance of the RSES, the “runners-up” merit mention. About one-tenth of the time, researchers employed one of an assortment of custom instruments. This commonplace resort to such “ad hoc” (Furr, 2011, p. 5) or impromptu instruments perhaps suggests that some researchers are dissatisfied with the more “official” alternatives.

The RSES-MFS and RSES-S might also be considered custom measures of self-esteem. Although both stem from the RSES, to our knowledge they have not been the subject of validation research in their specific forms. There are good grounds for suspecting that the properties of the original RSES might not automatically generalize to these altered forms. As regards the RSES-MFS, it is created by adding the temporally qualifying prefix phrase “Right now....” to all items. But the original items varied in their temporal extension (e.g., “I feel I have a number of good [i.e., enduring] qualities” versus “At times [i.e., on some occasions but not others], I think I am no good at all”). Hence, this variance would be removed or altered. Moreover, the RSES-MFS is typically used with ten more response options, whereas the RSES is typically used with four or five (see Table 2). As regards the RSES-S, the inclusion and exclusion of different numbers of items and items subsets would change both content coverage and internal consistency. As a consequence, one might expect non-trivial differences from the original RSES in terms of, for example, their factor structure, test-retest reliability, and predictive validity (Furr, 2011).

Although these instruments have gaps in their psychometric CVs, so to speak, we believe that their use is defensible. In the case of the RSES-MFS, modifications to the RSES

are intended to capture state, not trait, self-esteem. Moreover, if self-esteem is defined narrowly as an individual's overall evaluation of his or her worth, the RSES-MFS may capture self-esteem more directly or efficiently than the "go-to" alternative, the SSES (Heatherton & Polivy, 1991)—which focuses on evaluations of self across a variety of specific domains, such as physical appearance and educational attainment. The RSES-S, on the other hand, probably features in research often for practical reasons. For example, the research includes secondary analysis of longitudinal sociological surveys, which often include shortened versions of the RSES (see, for example, Erol & Orth, 2013; Kuster & Orth, 2013).

A motive for this meta-research was to assess how frequently implicit measures were being used to measure self-esteem, relative to traditional self-reports, given a lack of data on this topic. We found that this class of measures accounted for 12.48% of self-esteem measurement occasions—thereby collectively exceeding custom measures, but still only a quarter as popular as the RSES. In line with a recent survey of the literature (Buhrmester et al., 2011), the NLT or the SE-IAT were the most used instruments and were about equal in popularity. The SINL (Gebauer et al. 2008), which is something of a hybrid index, added a handful of additional measurement occasions.

These instruments represent perhaps the most distinctive methodological set over the period studied. Although no usage trends are apparent in the data studied, they represent measurement innovations that came into fashion, not surprisingly, with the rise of the "implicit" sub-branch of social cognition in the closing years of the 20th Century (Greenwald & Banaji, 1995; Payne & Gawronski, 2010), although the birth of the NLT as an instrument (Nuttin, 1985) considerably predates that of the IAT (Greenwald et al., 1998).

4.2. Measurement Details Were Variable

Our second key finding is more in keeping with Heatherton and Wyland (2003) assertion that the measurement of self-esteem was in a state of “chaos”. For the first time, our meta-research documents the vast variability in the details of self-esteem measures in psychological research, despite the RSES’s domination. First, the number of response options and response anchors used with self-report scales varied considerably. For example, as Table 4 shows, the RSES most often featured four and five response options, but researchers used each number of response options from two to ten, with the exception of three and eight. Moreover, Table 5 shows that self-report measures were employed with a wide variety of response anchors. The RSES, for example, was most often used with a *strongly disagree* to *strongly agree* response anchor combination, but no fewer than 17 others were also employed. Moreover, a staggering 35 response option/response anchor combinations were employed.

Second, the components of implicit measures varied considerably. For the SE-IAT, category labels, attribute labels, items categorised, and scoring procedure differed markedly. Across 53 measurement occasions, researchers used nine different combinations of category labels, three different combinations of attribute labels, 71 different positive items, 67 different negative items, and nine different scoring procedures. For the NLT, evaluational instructions, the number of response options employed, and scoring procedures were similarly unfixed. Across 43 measurement occasions, researchers issued five different evaluational instructions, used four different response formats, and applied seven different scoring procedures.

Is the variability in response scales and other details in the measurement of self-esteem something to worry about? A number of studies have found that even minor modifications to response formats influence scale score distributions and the strength of correlations with other scales (Krosnick, Judd, & Wittenbrink, 2005; Schwarz, 1999; Simms,

Kelazny, Williams, & Bernstein, 2019). To our knowledge, however, only one study has specifically investigated the matter in respect of measures of self-esteem. In that study, the RSES correlated somewhat heterogeneously with extraversion when it featured with four, five, or seven response options ($r = .53$, $r = .40$, $r = .48$) but homogeneously with neuroticism ($r = -.73$, $r = -.75$, $r = -.73$) (Hamby, 2015). Clearly, more research is required. However, it may safely be said that the degree of heterogeneity observed in respect of the number of response options, specifically for the RSES and to a lesser extent other self-report scales, is needlessly large.

In terms of implicit measures, Oakes, Brown, and Cai (2008) found that the strength of SE-IAT correlations with explicit self-esteem (self-liking, as measured by the Self-Liking and Self-Competence Scale) depended on whether self-related (e.g., *lovable*, *inadequate*) or non-self-related items (e.g., *balloon*, *famine*) were used as pleasant and unpleasant stimuli. In addition, Karpinski (2004) found that two IATs with different category labels and stimuli—the first comprised of self (e.g., the participants name, *me*, *I*) and unspecified other (e.g., *her*, *him*, *them*) categories; the second comprised of self (e.g., the participants name, *me*, *I*) and specified other (e.g., friend's first name, friend's last name, *him*) categories—were virtually uncorrelated within participant ($r = -.03$). In the case of the NLT, in two studies, Sakellaropoulou and Baldwin (2007) found that NLTs incorporating liking and attractiveness ratings were highly, but imperfectly, correlated within participant ($r = .62$ and $r = .73$, respectively).

The variability of measurement details in research on self-esteem, as well as the quite frequent use of the use of custom or on-the-fly measures, is in keeping with psychological research on emotion (Weidman, Steckler, & Tracy, 2016), mindwandering (Weinstein, 2017), aggressive behaviour (Elson, Rohangis, Johannes, Scharkow, & Quandt, 2014) and research in personality and social psychology in general (Flake, Pek, & Hehman, 2017). However, the

messy self-esteem measurement landscape revealed here reduces researchers' confidence that research findings from one study on self-esteem are relevant to another (Leary, 2006), complicates the interpretation and synthesis of research results (Wylie, 1974; 1989), jeopardises the replicability of research findings, and might prevent definitive empirical testing of theories of self-esteem (Fiske, 1971, Krause, 2012). Going forward, then, one of the self-esteem research community's priorities should be to achieve much greater consistency on the assessment of self-esteem.

4.3. How Does the Measurement of Self-Esteem Compare to Measurement Practices Elsewhere?

We have already mentioned that unstandardized use of the SE-IAT and NLT is in keeping with the unstandardized use of IAT in general and other measures frequently used in psychology. Two recent studies—one based on a sample of JPSP research articles published in 2014 (Flake et al., 2017), and the other based on research articles pertaining to emotion (Weidman, Streckler, & Tracy, 2016)—help us to evaluate further how the measurement of self-esteem compares to the measurement of other psychological constructs.

The measurement of self-esteem was distinctive in a number of ways. First, both Flake et al. (2017) and Weidman et al. (2016) found that the use of single-item instruments was commonplace, accounting for 30% and 58% of measurement occasions, respectively; the corresponding figure in our meta-research was just 4%. Second, both research teams found custom instruments were even more common than single-item scales, accounting for 40% and 69% of measurement occasions, respectively. The corresponding figure in our meta-research was just 10%. This disparity suggests that past criticisms of the measurement of self-concept for an over-reliance on custom instruments (Wylie, 1974, p. 324) have been heeded—perhaps a reassuring takeaway.

Nonetheless, the measurement of self-esteem shows some signs of greater heterogeneity. In our survey, researchers used 28 instruments (conservatively grouping customs instruments together as one; the figure without is 78). In contrast, fewer instruments were used to assess happiness ($n = 10$), sadness ($n = 12$), anger ($n = 19$), and anxiety ($n = 10$) (Weidman et al., 2016). However, it should be noted that Weidman and colleagues reported on measurement practices in a much smaller sample of articles than in the present research ($N = 328$).

4.4. Limitations

The comprehensive observational meta-research method employed here has a number of strong advantages over the CCM method employed in research until now. Nevertheless, like all meta-research (Ioannidis, 2010), ours has a number of limitations. The first limitation, related to our data extraction process, is that we permitted measures described as “explicit self-esteem”, “implicit self-esteem”, “state self-esteem”, and “trait self-esteem” to be included in the analysis. We anticipate that a number of readers will argue that a more fine-grained analysis, in which we treated these separately, might have been warranted. We would argue, however, that these are closely related constructs (e.g., the measurement of the stability of self-esteem necessarily entails the measurement of self-esteem; the measurement of the state form of self-esteem often only differs from the trait form by small changes of the wording of trait scales). In addition, the researchers we studied tended only to distinguish between types of self-esteem (e.g. implicit/explicit, state/trait) when they assessed both and referred to these as simply “self-esteem” when they did not. As a result, restricting our research only to measures described as measures of “self-esteem”, without qualifiers, would still have yielded implicit/indirect measures, such as the NLT or SE-IAT, and state scales, such as the RSES-MFS and SSES. Moreover, excluding implicit measures would have defeated one of our motives, which was to investigate how frequently these relatively new

measures are being used in comparison to traditional self-reports—an area where data was previously absent.

The second limitation, related to our inclusion/exclusion criteria for studies, is that our meta-research only included articles with the exact term “self-esteem” in their titles. Conceivably, self-esteem may have been measured in other articles in systematically different ways. Our meta-research, then, more specifically concerns the measurement of self-esteem in personality and social psychology *in research where self-esteem is of primary interest*. A third and final limitation is that the meta-research presented here does not include unpublished studies on self-esteem, which we did not include for simplicity.

The three limitations of our work may mean that we have painted an imperfect picture of the measurement of self-esteem in personality and social psychology at large. That said, we have do not expect that we would have different conclusions—for example, that the RSES was the most used measure, or that implicit measures were among the next most popular measures—if we had included studies in articles without self-esteem in their titles, or unpublished studies. This is, however, a potentially interesting direction for future meta-research.

4.5. Concluding Remarks

The present meta-research provides researchers, for the first time, with a detailed map of the measurement of self-esteem in personality and social psychology. Our research shows that the measurement of self-esteem has been consistent at one level, but problematically diverse at another. Researchers in the two fields have used the RSES far more frequently than all other measures of self-esteem. While the validity of the RSES is a complex topic, researchers should be aware of its beginnings as a Guttman scale, mindful of the many definitions of self-esteem in the psychological research and the definition of self-esteem that guided its construction, and the scale’s disputed dimensionality. On the other hand, there is

substantial variation in the details of measurement procedures from study-to-study, including self-report scale response options and anchors, stimuli and labels for the SE-IAT, and evaluational instructions for the NLT. This messy measurement landscape likely undermines research on self-esteem and, looking to the future, one of the self-esteem research community's priorities should be to collectively strive for a more considered and consistent measurement approach.

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Table 1

Number and Percentage of Measurement Occasions (N = 769) Accounted for by the 29 Instruments Used to Measure Self-Esteem

Measure	<i>n</i>	%
Rosenberg Self-Esteem Scale (Rosenberg, 1965)	430	55.92
Custom instruments	76	9.88
Self-Esteem Implicit Association Test (Greenwald & Farnham, 2000)	53	6.89
Name Letter Preference Test (Greenwald & Banajia, 1995)	43	5.59
Modified for states Rosenberg Self-Esteem Scale (Rosenberg, 1965)	42	5.46
State Self-Esteem Scale (Heatherton & Polivy, 1991)	31	4.03
Single Item Self-Esteem Scale (Robins, Hendin, & Trzesniewski, 2001)	20	2.60
Shortened Rosenberg Self-Esteem Scale (Rosenberg, 1965)	19	2.47
Single Item Name-Liking Measure (Gebauer, Riketta, Broemer, & Maio, 2008)	8	1.04
Self-Liking and Self-Competence Scales (Tafarodi & Swann, 1995; 2001)	7	0.91
Three subscales of the Revised Inadequacy Scale (Fleming & Courtney, 1984)	5	0.65
Full Revised Inadequacy Scale (Fleming & Courtney, 1984)	4	0.52
Self-esteem affective priming tasks	4	0.52
Birthday number preferences	4	0.52
Bachman revision of Rosenberg Self-Esteem Scale (Bachman, 1970)	3	0.39
Implicit Self-Evaluation Survey (Pelham & Hetts, 1999)	3	0.39
Unspecified	3	0.39
Global subscale of Self-Perception Profile for Children (Harter, 1988)	2	0.26
Texas Social Behaviour Inventory (Helmreich and Stapp, 1974)	2	0.26
Culture-Free Self-Esteem Inventory (Battle, 1992)	1	0.13
Self-Attributes Questionnaire (Pelham & Swann, 1989)	1	0.13
e-Darling Trait Self-Esteem Scale (Gebauer, Leary, & Neberich, 2012)	1	0.13
Self-Esteem Go No-Go Association Test (Nosek & Banaji, 2001)	1	0.13
Shortened Coopersmith Self-Esteem Inventory (Coopersmith, 1967)	1	0.13
Piers-Harris Children's Self-Concept Scale (Piers, 1984)	1	0.13
California Self-Evaluation Scales (Phinney & Gough, 1984)	1	0.13
Narcissistic Personality Inventory (Raskin & Hall, 1979)	1	0.13
Pictorial State Self-Esteem Scale (Bradley & Lang, 1994)	1	0.13
Self-Perception Profile for Adolescents (Harter, 1988)	1	0.13

Table 2

Percentage of Measurement Occasions Accounted for by Number of Response Options and Cronbach's Alpha Statistics for Commonly Used Self-Report Scales

	RSES	Custom	RSES- MFS	SSES	RSES-S	SISE	SLSC
Response options							
Occasions reported	265	72	33	25	15	19	2
2	0.75	—	—	—	6.67	—	—
3	—	2.63	—	—	—	—	—
4	36.60	5.26	3.03	8.00	26.67	—	—
5	30.56	21.05	9.09	72.00	46.66	68.42	100.00
6	4.15	—	—	—	—	—	—
7	15.85	35.53	15.15	8.00	13.33	5.26	—
8	—	—	—	—	—	—	—
9	11.70	9.21	3.03	4.00	—	15.78	—
10+	0.38	2.63	69.70	8.00	6.67	—	—
Cronbach's alpha							
<i>M</i>	0.87	0.82	0.89	0.85	0.76	—	0.88
<i>Mdn</i>	0.88	0.84	0.89	0.86	0.79	—	0.90
<i>SD</i>	0.05	0.09	0.04	0.04	0.10	—	0.07
<i>n</i>	367	70	20	32	20	—	6

Note. RSES = Rosenberg Self-Esteem Scale (Rosenberg, 1965). MFS-RSES = modified for states Rosenberg Self-Esteem Scale. SSES = State Self-Esteem Scale (Heatherton & Polivy, 1991). S-RSES = shortened Rosenberg Self-Esteem Scale. SISE = Single Item Self-Esteem Scale (Robins, Hendin, & Trzesniewski, 2001). SLSC = Self-Liking and Self-Competence Scales (Tafarodi & Milne, 1995; Tafarodi & Swann, 2001). Response option percentages are percentage of measurement occasions accounted for when response options were reported.

Table 3

Response Anchor Information for Commonly Used Self-Report Scales

Scale	Combinations	N MO reported (%)	Response anchor combinations
RSES	18	224 (52.09)	<p>Strongly disagree to strongly agree ($n = 165$)</p> <p>Very strongly disagree to very strongly agree ($n = 8$)</p> <p>Strongly agree to strongly disagree ($n = 8$)</p> <p>Not very true of me to very true of me ($n = 5$)</p> <p>Totally disagree to totally agree ($n = 4$)</p> <p>Don't agree at all to I totally agree ($n = 4$)</p> <p>Completely true to not at all true ($n = 4$)</p> <p>Disagree very much to agree very much ($n = 4$)</p> <p>Not at all descriptive of me to very descriptive of me ($n = 4$)</p> <p>Not at all to very much ($n = 3$)</p> <p>Not at all to extremely ($n = 3$)</p> <p>Completely disagree to completely agree ($n = 2$)</p> <p>Strongly disagree, disagree, agree, strongly agree ($n = 2$)</p> <p>Yes to no ($n = 2$)</p> <p>Does not describe me at all to describes me very well ($n = 1$)</p> <p>Applies not at all to applies totally ($n = 1$)</p> <p>Does not apply to me at all to applies to me very well ($n = 1$)</p> <p>Not at all to very strongly agree ($n = 1$)</p>
Custom	18	47 (61.84)	<p>Not at all to very much ($n = 14$)</p> <p>Not at all to extremely ($n = 7$)</p> <p>Strongly disagree to strongly disagree ($n = 5$)</p> <p>Very bad to very good ($n = 3$)</p> <p>Very cold to very warm ($n = 3$)</p> <p>Agree to disagree ($n = 1$)</p> <p>Applies not at all to applies totally ($n = 1$)</p> <p>Disagree to agree ($n = 2$)</p> <p>Dislike extremely to like extremely ($n = 1$)</p> <p>Dislike strongly to like strongly ($n = 1$)</p> <p>Extremely low to extremely high ($n = 1$)</p> <p>False to true ($n = 1$)</p> <p>Never to always ($n = 1$)</p> <p>Not at all to especially ($n = 1$)</p> <p>Strongly agree to strongly disagree ($n = 1$)</p> <p>Strongly disagree, disagree, agree, strongly agree ($n = 1$)</p> <p>Very low to very high ($n = 1$)</p>

			Yes to no ($n = 1$)
RSES-MFS	3	30 (71.42)	Strongly disagree to strongly agree ($n = 28$) Disagree very much to agree very much ($n = 1$) Not at all descriptive of me to very descriptive of me ($n = 1$)
SSES	6	18 (58.06)	Not at all to extremely ($n = 8$) Strongly disagree to strongly agree ($n = 3$) Completely false to completely true ($n = 3$) Not at all to very much ($n = 2$) Don't agree at all to I totally agree ($n = 1$) Not at all descriptive of me to very descriptive of me ($n = 1$)
RSES-S	7	14 (73.68)	Strongly disagree to strongly agree ($n = 8$) Agree to disagree ($n = 1$) Disagree to agree ($n = 1$) Disagree very much to agree very much ($n = 1$) Extremely uncharacteristic of me to extremely characteristic of me ($n = 1$) Never to very often ($n = 1$) Very inaccurate to very accurate ($n = 1$)
SISE	5	19 (95.00)	Strongly disagree to strongly agree ($n = 10$) Does not apply at all to applies completely ($n = 3$) Not very true of me to very true of me ($n = 3$) Disagree to agree ($n = 2$) I do not have this trait / I show this trait very much ($n = 1$)
SLSC	1	1 (14.28)	Strongly disagree to strongly agree ($n = 1$)

Note. RA = response anchors. MO = measurement occasions.

Table 4

Self-Esteem Implicit Association Test Stimuli

Positive ($n = 71$)	Active, admirable, beach, beautiful, bright*, candy, charm, cheerful, child, clown, diamond*, dream, even-handed, excellent, flower, free, freedom, friend, gift, gifted, good, happiness, happy, harmony, health*, heaven, holiday, human, humor, idea, joy*, kiss, laughter, life, love, loveable, luck, lucky*, mother, nice*, palace, paradise, party, peace*, pleasant, pleasure, praise, precious, pride, rainbow, safety, satisfied, silk, smart*, smile, soul, splendid*, success*, summer, sun, sunny, sunrise*, sunset, sunshine, trust, vacation, valuable, valued*, warmth*, victory, worthy*
Negative ($n = 67$)	Agony*, anger, angry, army, awful*, bad, bomb, brutal*, cancer, cockroach, coffin, coma, cost, crime, death*, despair, dirt, disaster, disease, dishonest, dumb, evil, failure*, filth*, fraud, garbage, greedy, grief*, hell, inadequate, inertial, inferior, jail, liar, mean, misery, murder, pain*, panic, pest, pimple, poison*, poor, rotten*, sad, shame, sickness*, sin, skull, snake, spider, stink*, stupid*, threat, tragedy*, trash, ugly*, undesirable, unjust, unlovable, unpleasant, useless*, vain, virus, vomit*, war, weary
Self-related ($n = 14$)	Me*, my*, own, I*, self*, other, mine*, first name*, last name*, month of birth, place of birth, gender*, zodiac sign, city of residence*
Non-self-related ($n = 28$)	They*, your, them*, you, others, theirs, other, it*, that, his, her, those, other's first name, other's last name, these, their*, him, best friend's family name, best friend's first name, best-friend's hometown, best friend's birthday, we, our, ours, us, other's birthday, other's city of residence

Note. * = item appears in Greenwald & Farnham (2000, p. 1038, APPENDIX A).

Figure 1. Full-text articles identified and excluded. Additional information on total number of self-esteem studies and measurement occasions is also provided. SE = self-esteem.

Figure 2. Percentage of measurement occasions accounted for by the ten most used measures of self-esteem in each year (2004 to 2015). RSES = Rosenberg Self-Esteem Scale. Custom = SE-IAT = Self-Esteem Implicit Association Test. NLT = Name Letter Task. RSES-MFS = Rosenberg Self-Esteem Scale modified for states. SSES = State Self-Esteem Scale. RSES-S = Rosenberg Self-Esteem Scale shortened. SISE = Single-Item Self-Esteem Scale. SINL = Single-Item Name Liking Measure. SLSC = Self-Liking and Self-Competence Scales.

Figure 3. Distribution of Cronbach's alphas ($N = 515$) for multi-item self-report scales. Band = median, lower hinge = 25th percentile, upper hinge = 75th percentile, lower whisker = smallest observation greater than or equal to lower hinge + 1.5 times interquartile range, upper whisker = largest observation less than or equal to upper hinge + 1.5 times interquartile range. RSES = Ten item Rosenberg Self-Esteem Scale (Rosenberg, 1965), RSESMFS = Modified for states RSES, RSESS = Shortened Rosenberg Self-Esteem Scale, SLSC = Self-Liking and Self-Competence Scales (Tafarodi & Swann, 1995), SSES = State Self-Esteem Scale (Heatherton & Polivy, 1991).

Figure 4. Distribution of Cronbach's alphas by number of response options for all self-report scales (top panel) and for the RSES (bottom panel). NR = not reported.

Figure 5. Distribution of reliability estimates (internal consistency and test-retest type) for SE-IAT ($n = 27$) and NLT ($n = 22$). Band = median, lower hinge = 25th percentile, upper hinge = 75th percentile, lower whisker = smallest observation greater than or equal to lower hinge + 1.5 times interquartile range, upper whisker = largest observation less than or equal to upper hinge + 1.5 times interquartile range.