# What's Really in a Name-Letter Effect?

## Name-Letter Preferences as Indirect Measures of Self-Esteem

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Abstract

People show a preference for the letters occurring in their name (Name-Letter Effect, Nuttin, 1984), a phenomenon that has inspired the development of a frequently used indirect measure of self-esteem. This article reviews the literature on the Name-Letter Effect as the basis for this measure. It discusses the tasks that have been used to measure name-letter preferences and the algorithms that have been designed to extract self-esteem scores from them. It also reviews the evidence that name-letter preferences are valid indicators of self-esteem. The article shows that current knowledge on the value of name-letter preferences as measures of self-esteem is limited by (a) the inherent difficulty of assessing the validity of implicit measures, (b) the use of different, insufficiently justified algorithms, (c) a historical focus on preferences for initials, and (d) neglect of the state-trait distinction. The article ends with recommendations for the use of name-letter preferences to measure self-esteem.

*Key words*: Self-Esteem, Name-Letter Effect, Indirect Measures, Implicit Measures, Mere Ownership

What's Really in a Name-Letter Effect? Letter Preferences as Indirect Measures of Self-Esteem

Thirty years ago Jozef Nuttin reported that people particularly liked letters that appear in their names. He coined the term Name-Letter Effect (NLE) to describe this preference and argued that it was an indicator of self-attachment (Nuttin, 1984). In the mid-1990s, researchers suggested that the NLE had the potential for an implicit self-esteem measure (Greenwald & Banaji, 1995). Today, letter preference tasks are among the most popular implicit self-esteem measures, surpassed only by the Implicit Association Test (Buhrmester, Blanton, & Swann, 2011; Greenwald & Farnham, 2000). This article reviews the literature on name-letter preferences as indirect measures of self-esteem. Opening with an account of early research, the article provides an overview of paradigms researchers have used to measure name-letter preferences. It reviews three decades of research on the NLE as well as two decades of research on name-letter preferences as indicators of self-esteem and ends with suggestions for the future use of name-letter preference measures.

Three meta-analyses have been published on name-letter preferences as indirect measures of self-esteem (Buhrmester et al., 2011; Krizan & Suls, 2008; Stieger, Voracek, & Formann, 2012). In contrast to the present article, which examines the NLE as a generally occurring phenomenon as well as individual differences in name-letter preference, these meta-analyses focused on individual differences. Moreover, they were limited to studies using letter rating tasks, they focused on preferences for initials, and they neglected to address whether name-letter preferences are relevant to state or trait self-esteem (for an exception see Buhrmester et al., 2011, who discussed the state-trait issue). I relied on these meta-analyses and also on a Google Scholar search using the terms 'Name-Letter Effect', 'Name-Letter preference', 'Letter rating task', 'Implicit Self-Esteem', and 'Nuttin (1985)'. I considered all peer-reviewed publications on the

NLE and name-letter preferences as a self-esteem measure, including publications that postdate the meta-analyses. Finally, I consulted Johnson's dissertation (1986), my dissertation (Hoorens, 1990a,b), and a relevant book (Loosen, 1990).

This review does not cover studies in which self-esteem scores were derived from name-letter and birthday number preferences combined (e.g., Shimizu & Pelham, 2011). Neither does it cover the (controversial) literature about implications of name-letter preferences for choices between the places, occupations, brands, and individuals that share or that do not share one's name-letters (e.g., Holland, Wennekers, Bijlstra, Jongenelen, & Van Knippenberg, 2009; for a refutation of field studies on name-letter-driven real-life decisions see: Simonsohn, 2011a,b). Although the emergence of this literature has led some researchers to define the NLE as liking for persons, places, and things that have names similar or initials identical to one's own (e.g., Howards & Kerin, 2013), this article continues to use the term 'Name-Letter Effect' in its original meaning.

## Mere Ownership and the Preference for Own Name Letters

Nuttin's conjecture that people might show a preference for the letters of their name emerged from an "Aha!" experience he had while driving on the highway. It occurred to him that the license plates of some passing cars gave him a pleasant feeling. Wondering why this might happen, he noticed that these plates contained some letters in his name. He speculated that people prefer stimuli that are associated with the self, no matter how trivially. Using a design that eliminated various potential confounds, he went on to obtain empirical support for the hypothesis that people value letters more when they feature in their name (Nuttin, 1984, 1985).

In the 1980s, the idea that people experience their names as self-attributes or symbolic possessions was already broadly shared (cf. Hoorens, 1990a; Koole & Pelham, 2003). Many

researchers also suspected that self-related objects were particularly attractive (Irwin & Gebhard, 1946; Wolff, 1943). Still, the NLE was novel for three reasons. First, it provided unprecedented support for the mere ownership hypothesis. Early studies on ownership effects fell short of present-day methodological standards. Even ownership effects later demonstrated for possessions (Beggan, 1992), symbols and characters (Feys, 1991), working time (Hoorens, Remmers, & Van de Riet, 1999) and personally generated arguments (De Dreu & van Knippenberg, 2005), have not gone undisputed (e.g., Barone, Shimp, & Sprott, 1997). In the case of tangible possessions, for instance, ownership is often confounded with the need to justify one's choices (Morewedge, Shu, Gilbert, & Wilson, 2009). Such confounds do not occur for letters. Second, Nuttin suggested that people valued not only self-related objects (e.g., their names), but also the constituent parts of these objects (e.g., the letters in their names). Third, he suggested that people did not need to be aware of the fact that mere ownership governed their preferences for the NLE to occur.

Realizing how surprising the NLE was, Nuttin originally hesitated to bring it to the scientific forum. When he reported it in an Address to the Dutch Association of Social-Psychological Researchers in 1984, he had been sitting on the data from his seminal studies for seven years. As he expected, his address and two subsequent articles in *European Journal of Social Psychology* (Nuttin, 1985, 1987) were met with widespread skepticism. At some point, rumours began circulating that he owed the publication of his articles to his former student, John Rijsman, serving as the editor of *European Journal of Social Psychology*.

One member of Nuttin's own department described the NLE as a "fascinating idolum" (Loosen, 1990, p. 54; idolum is Latin for "spectre" or "fallacy") and "so strange that a down-to-earth researcher will spontaneously think of an artefact [sic]" (Loosen, 1990, p. 11). Without suggesting that the NLE was spurious, other researchers doubted its psychological relevance.

Over the first five years (1985-1989), Nuttin's 1985 article was cited only once by his colleagues (Cialdini & DeNicholas, 1989). In the next five years (1990-1994), it was cited five times. My first conference presentation (Hoorens, 1987), based on my then ongoing dissertation under Nuttin's supervision (Hoorens, 1990a), was attended by a crowd of two – including a friend who came to support me on my maiden speech. The NLE was followed up in no independent laboratory with the exception of that of Greenwald's and the doctoral dissertation of his student, Johnson (1986; now Schumacher) at the Ohio State University.

The situation changed when self-esteem researchers began being interested in self-esteem measures that were not self-report based. Nuttin (1987) had already stated that the NLE "could prove to be relevant as an unobtrusive measure of one or another dimension of attachment to self" (p. 383). Yet, it was only after Greenwald and Banaji (1995) suggested that the NLE might form the basis of an indirect measure of self-esteem that researchers grasped its relevance. Citations of Nuttin's original articles have been gathering pace since then. I located 14 citations of the 1985 article in 1994-1999; approximately 50 in 2000-2004, approximately 110 in 2005-2009, and approximately 200 in the last few years. By September 2014, Google Scholar reported that the 1985 article totalled 379 citations and that the 1987 article totalled 245 citations (Google Scholar). These are not the stellar numbers of some classics in social psychology, yet they are belatedly impressive for work almost uncited ten years after its publication.

## Measuring Name-Letter Preferences

This section describes the tasks through which researchers have tried to measure name-letter preferences. The most extensively used task is a letter rating task. Researchers using it typically transform participants' ratings to adjust for potential confounds. The various adjustment algorithms that have been developed are also discussed in this section.

**Letter Preference Tasks**

Nuttin's aim was to examine whether being a name-letter was sufficient to enhance a letter's attractiveness. To test whether mere ownership could—like, say mere exposure—increase attractiveness, he needed to show that the NLE was not caused by another determinant—including, indeed, mere exposure (Zajonc, 1968). Alluisi and Adams (1962; Anderson, 1965) had reported that people like frequently used letters better than infrequently used ones. If letters that occur frequently in natural language are likely to occur as name-letters, mere exposure might indeed create spurious name-letter preferences. Nuttin therefore sought to develop designs that controlled for differences in letter frequencies as well as in all visual and acoustical characteristics of letters (e.g., their visual complexity).

In his first study, Nuttin used what he referred to as a *yoked design* (Nuttin, 1985, Study 1). He presented school girls with letter pairs and asked them to select the more attractive letter within each pair. Unbeknownst to participants, the stimulus lists, which were individually tailored, consisted of two sub-lists. In one sub-list, each letter pair included one letter of the participant's name and one letter not in her name. In the other sub-list, each pair consisted of a name-letter and a non-name-letter of another participant. This other participant responded to the same two sub-lists so that participants were yoked in pairs. Each letter pair was thus judged twice: once by the 'owner' of the name hidden in the sub-list and once by another participant. In a follow-up study on university students, Nuttin (1985, Study 2) again used a yoked design. In this case, the stimulus lists consisted either of letter pairs or of letter triads (with each triad including one name-letter and two non-name letters), where the letters Q, X, Y, and Z, which are rarely used in Dutch, either were or were not included as non-name-letters. Moreover, half of the

participants were instructed to circle the most attractive letter, whereas the other half were instructed to cross out the least attractive letter (in pairs) or letters (in triads).

One limitation of the yoked design is restricted power. Participants often share several name-letters. If they like their name-letters, therefore, they should also like a few name-letters of the yoked partner—namely, those that also occur in their own name. This possibility limits the maximum difference that can be observed between the proportion of name-letters chosen by the owner of the name used to construct the sub-list and the proportion chosen by the non-owner. It was this limitation that led Loosen (1990) to suggest that the NLE was spurious. He argued that the mean proportion of name-letters chosen in the sub-list of the yoked partner was implausibly low, which "would force the experimenter into believing either that he has observed a very exceptional sample, or that in choosing letters in their partner's list the subjects were suddenly overcome with an inexplicable aversion for their own NLs" (p. 14). In fact, Loosen's criticism was based on the assumption that participants were randomly yoked. This assumption was erroneous. As Nuttin (1985) had already explained, he initially tried to limit the number of shared name-letters by yoking participants whose names did not share any syllables. In follow-up studies, a computer program was used to mimize the number of shared letters.

Besides having restricted power, the yoked design is cumbersome. Researchers need prior access to participants' names. They need to yoke participants such that the names share as few letters as possible, prepare personalized materials, and then make sure that the right materials land with the right participants. The procedure is also error-prone, as I discovered after having messed up what was meant to become my first study on the NLE.

Johnson (1986) simplified the yoked design by having all participants respond to an identical list of letter pairs. These pairs were formed by categorizing the letters of the alphabet

into triads of letters with similar frequency of usage in natural language (excluding the rare letters Q and Z), and forming all possible pairs within each triad. These pairs were then randomly ordered to form a stimulus list of 24 letter pairs that was used for all participants. Per participant, however, only those pairs in which one of the two letters was a name-letter were then included in the analysis (i.e., all pairs that consisted of two name-letters or two non-name-letters were excluded). The paired comparison task was easier to use than the yoked design. Unfortunately, it did not allow participants to express a preference for all of their name-letters because some name-letters might be paired with other name-letters, which was particularly likely for high-frequency letters.

The *letter selection task* (Hoorens, Nuttin, Erdélyi-Herman, & Pavakanun, 1990; Hoorens & Todorova, 1988; Nuttin, 1987) takes a different approach. It involves presenting participants with the letters of the alphabet and asking them to select a given number of most (or least) preferred letters. Per letter, a researcher calculates the proportion of times it is chosen (or not rejected) by participants for whom it is a name-letter and by participants for whom it is a non-name-letter. A variation consists of having participants rank order the alphabet (Hoorens & Nuttin 1993, Study 3). This approach allows the calculation, per letter, of an average rank across participants, and the subsequent calculation, per letter and per participant, of a *z*-score indicating the discrepancy between the participant's ranking and the letter's average rank. These *z*-scores are then averaged over participants for whom the letter is a name-letter and participants for whom it is a non-name-letter. A randomization test for matched pairs (a non-parametric test for non-independent responses; Edgington, 1980) can be applied across letters to test the difference between either the proportions (letter selection task) or the mean z-scores for name-letters and non-name-letters (*rank-ordering task*).

All tasks described thus far were developed to demonstrate the NLE as a generally occurring phenomenon. Except in the case of the rank ordering task, calculating individual scores is not straightforward. Most researchers with an interest in individual differences therefore used a *letter rating task* (for exceptions, see: Aidman, 1999; Verkuyten, 2005) that has often been attributed to Nuttin (1985, 1987) but that was actually introduced in Johnson's dissertation (1986, Studies 6-9). The task consists of having participants judge all the letters of the alphabet. Specific applications differ in terms of the instructions (e.g., rating how much one likes the letters versus how much one finds them attractive), the scale (e.g., 5-point), the order of the letters (random, alphabetical), and the data collection mode (paper-and-pencil versus computer-based). The task has been given various names: The "Name Letter (Preference) Task" (Gebauer, Göritz, Hofmann, & Sedikides, 2012; Huntsinger, 2013; Koole, Govorun, Cheng, & Gallucci, 2009; Pavlova, Uher, Dennington, Wright, & Donaldson, 2011; Phillips & Hine, 2013; Phillips, Hine, & Bhullar, 2012), the "Name Letter Test" (Buhrmester et al., 2011), the "Name-Letter-Ratings Measure" (Schmeichel, Gailliot, Filardo, McGregor, Gitter, & Baumeister, 2009), the "Name-Letter Self Esteem Measure" (Uhlman, Leavitt, Menges, Koopman, Howe, & Johnson, 2012), the "Name-Letter Effect Measure" (Gurari, Strube, & Hetts, 2009), or the "Name-Letter Effect" (DeHart, Pelham, & Tennen, 2006).

**Controlling for Potential Confounds in the Letter Rating Task**

Researchers assessing name-letter preferences via a letter rating task are aware that the attractivess of letters may depend on letters' characteristics other than their occurring in a participant's name and on individual differences other than a participant's self-esteem. Among the potentially relevant letter characteristics are their visual complexity, acoustical pleasantness, and frequency of occurrence. Among the potentially relevant individual differences are response

tendencies, transient or chronic mood states, and general liking for letters. Users of the letter rating task have therefore developed a variety of algorithms designed to control for these potential confounds.

To control for differences between letters in terms of their visual complexity, acoustical pleasantness, and frequency of occurrence (among other determinants of their attractiveness) Kitayama and Karasawa (1997) proposed adjusting name-letter ratings for letter baselines. Their 'baseline-correction algorithm' consists of calculating, per letter, the mean rating by participants for whom it is a non-name-letter, and then subtracting this mean from a participant's name-letter rating. To control for response tendencies, mood states, and general letter liking, Schröder-Abé, Rudolph, Wiesner, and Schütz (2007) proposed a 'self-correction algorithm', which involves subtracting from a participant's mean rating of letters in their name the participant's mean ratings of other letters. In one recent study researchers controlled for response tendencies, mood states, and general letter liking by dividing a participant's name-letter ratings by the mean rating by the same participant of other letters (Sariyska et al., 2014).

More complicated algorithms were developed to control simultaneously for letter attractiveness, transient moods, response tendencies, and general letter liking. Among these algorithms are the double-correction algorithm (Gawronski, Bodenhausen, & Becker, 2007), the ipsatized double-correction algorithm (Baccus, Baldwin, & Packer, 2004), the *z*-transformed double-correction algorithm (De Raedt, Schacht, Franck, & De Houwer, 2006, Study 2), and a rarely used regression-based algorithm (Albers, Rotteveel, & Dijksterhuis, 2009). The double-correction algorithm involves using the baseline-correction (Kitayama & Karasawa, 1997) and dividing the obtained differences by the participant's mean rating of all letters. The ipsatized double-correction algorithm involves using the self-correction (Schröder-Abé et al., 2007) and

subtracting ipsatized letter baselines (obtained by subtracting from the letter ratings the participant's mean ratings over all other letters) from the self-correction name-letter scores. Researchers using the *z*-transformed double-correction algorithm first standardize each participant's letter ratings on the basis of the mean and the standard deviation of that participant's ratings. They then calculate letter baselines on the basis of the standardized ratings by those participants for whom the letter is a non-name-letter. Finally, they calculate, per name-letter, a difference score by subtracting the standardized letter baseline from the standardized name-letter rating. Finally, researchers using the regression-based algorithm regress onto any given name-letter the participant's mean rating of non-name-letters as well as the average rating of that letter by participants for whom it is a non-name-letter. Subsequently, they use the regression coefficients that come out of this regression to multiply the participant's mean rating of non-name-letters as well as the average rating of the name-letter by participants for whom it is a non-name-letter. Finally, they sum the products and subtract the outcome from the name-letter rating.

In the description of the algorithms, I have thus far used the expression 'name-letters' to denote all letters in a given individual's name. In fact, the vast majority of researchers have solely focused on initials. I have also used the expression 'other letters' or 'non-name-letters' to describe the letters that were included in the calculation of baselines. Some researchers indeed have calculated letter baselines on the basis of ratings by participants for whom the letter was not a name-letter (Dijksterhuis, 2004; Zeigler-Hill, Clark, & Beckman, 2011). Still, others have calculated them on the basis of ratings by all participants (Bosson, Brown, Zeigler-Hill, & Swann, 2003), by participants for whom the letter was not an initial (Svaldi, Zimmermann, & Naumann, 2012), or by a separate sample of participants (Karpinski, Steinberg, Versek, & Alloy, 2007; Study 1, 3, & 4). Similarly, some researchers have derived individual baselines on the basis

of ratings for non-name-letters (DeHart & Pelham, 2007; De Raedt et al., 2006), whereas others have used the participant's ratings of all letters or of non-initials (LeBel, 2010; Sakellaropoulo & Baldwin, 2007; Schimmack & Diener, 2003; Tracy, Cheng, Robins, & Trzesniewski, 2009).

## The Name-Letter Effect as a General Phenomenon in Letter Preferences

The NLE as a phenomenon that generally characterizes people's letter preferences has been amply documented. A long, and long-discussed, problem in the scientific literature is that significant effects are more likely to be published than non-significant ones. Since the emergence of meta-analytic techniques, however, various parameters have been developed to quantify this so-called publication bias in research on a given topic. The authors of a recent meta-analysis calculated several such parameters and found no trace of a publication bias in articles on the NLE (Stieger, Voracek, & Formann, 2012).

The NLE generalizes across participant gender (Pelham, Koole, Hardin, Hetts, Seah, & DeHart, 2005; for exceptions, see: Albers et al., 2009; Stieger, Preyss, & Voracek, 2012). It has been documented in different cultures and alphabets, including the Roman alphabet (Hoorens & Nuttin, 1993; Hoorens et al., 1990, Study 1, 3, and 4; Nuttin, 1985, 1987; Hoorens, Takano, Franck, Roberts, & Raes, 2014), the Roman alphabet extended with Hungarian letter combinations (Hoorens et al., 1990, Study 2), the Greek alphabet (Nuttin, 1987), the Cyrillic alphabet (Hoorens & Todorova, 1988), the Thai alphabet (Hoorens et al., 1990, Study 3 & 4), and the Japanese hiragana alphabet (Kitayama & Karasawa, 1997).

Against the possibility that people merely prefer name-letters because these were the first they learned to write as a child, the NLE gains strength over primary school years rather than being strong among early writers and then levelling off (Corenblum & Armstrong, 2012; Hoorens et al., 1990). In fact, the NLE occurs in people of all ages, from school children to middle- and

old-aged adults (Gregg & Sedikides, 2010; Hoorens et al., 2014; Huntsinger, 2011; Koole, Dijksterhuis, & Van Knippenberg, 2001; Stieger & LeBel, 2012; for an exception, see: Kernis, Lakey, & Heppner, 2008). Also running against the 'primacy of own name writing' interpretation, people prefer name-letters not only in the first alphabet that they have learned as a child (usually starting with their name), but also in alphabets that they have learned later on (usually not starting with their name) in the course of foreign language acquisition. Apparently, the sole condition for a NLE to occur in a second alphabet is that people should not hold negative feelings towards the language that necessitates them to learn this alphabet. To illustrate this point, Table 1 summarizes the results of a letter selection task as it was administered to three samples of 'bi-alphabetical' participants: Bulgarian participants, whose mother tongue was written in the Cyrillic alphabet but who also mastered the Roman alphabet, Thai participants, whose mother tongue was written in the Thai alphabet, but who also mastered the Roman alphabet, and Polish participants, whose mother tongue was written in the Roman alphabet but who also mastered the Cyrillic alphabet (Hoorens, 1990a; Hoorens et al., 1990; Hoorens & Todorova, 1988). All participants selected their six most preferred letters from the stimulus alphabet at hand. A NLE occurred in all 'native' alphabets and in the 'non-native' alphabet of two samples. Tellingly, the exception was Polish participants who at that time were obliged, but not particularly eager, to learn Russian and the Cyrillic alphabet associated with it.

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Insert Table 1 about here

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A significant NLE has been demonstrated with all published measures and algorithms and in paper-and-pencil and computerized letter preference tasks (Stieger, Voracek, & Formann,

2012). Still, it is affected by task characteristics. It is stronger (at least for initials and when preference scores are calculated through the baseline-correction algorithm) when participants rate the likeability rather than the beauty of letters. It is also stronger when the rating scale has fewer rather than more points (Stieger & Burger, 2012). Moreover, it is stronger when participants are asked to follow their gut feelings than when they think over and prepare to explain their ratings (Koole et al., 2001, Study 2).

The NLE is generally stronger for first name letters than for family name letters (Hoorens et al., 1990; Study 1, 3, & 4; Koole et al., 2001; Nuttin, 1987). Importantly, however, the NLE has been established for letters of the last name as well as for letters of the first name (Hoorens et al., 1990, Study 1 & 3; Hoorens & Todorova, 1988; Koole et al., 2001; Nuttin, 1985, Study 2; Nuttin, 1987). In a study on preferences for initials, Stieger and LeBel (2012) found that people who had changed their last name to their married names continued to show a preference for the initial of their birth name decades into their marriage.

The NLE is generally stronger for initials than for non-initials (Johnson, 1986, Study 3 & 5-9; Kitayama & Karasawa, 1997; Koole et al., 2001; Nuttin, 1987). Importantly, however, significant NLEs have been observed for non-initial name-letters as well (Hoorens et al., 2014; Hoorens & Todorova, 1988; Johnson, 1986, Study 2, 4, 5, & 8; Kitayama & Karasawa, 1997; Koole et al., 2001; Nuttin, 1985, Study 2; Nuttin 1987). For example, Hoorens et al. (2014) had participants from a community sample fill out daily letter rating tasks for seven consecutive days. Using the baseline-correction algorithm, they found a NLE that was stronger for initials than for non-initials, but that was significant in both cases. Only one published study has yielded a NLE for initials but not for non-initials (Koole, Smeets, Van Knippenberg, & Dijksterhuis, 1999, Study 3).

Despite the fact that the NLE holds for both initials and non-initials, researchers using letter rating tasks have almost exclusively focused on preferences for initials. One consequence is that demonstrations of the NLE for non-initials have become outnumbered by demonstrations for initials (Creemers, Scholte, Engels, Prinstein, & Wiers, 2012; Gawronski et al., 2007, Study 3 & 4; De Raedt et al., 2006, Study 2; Franck, De Raedt, & De Houwer, 2007; Gebauer et al., 2012; Jones, Pelham, Mirenberg, & Hetts, 2002; Komori & Murata, 2008; Schimmack & Diener, 2003). This situation has contributed to the misunderstanding that the NLE is limited to initials (Dyjas, Grasman, Wetzels, Van der Maas, & Wagenmakers, 2012; Franck et al., 2007; Geng & Xu, 2011; Sariyska et al., 2014). Some researchers even proposed labelling the letter rating task the "Name Initials Letter Task" (Sava, Maricutoiu, Rusu, Macsinga, & Vîrgă, 2011) or the "Initial(s) Preference Task" (Sariyska et al., 2014; Schröder-Abé et al., 2007; Steinberg, Karpinski, & Alloy, 2007; Stieger & Burger, 2010; Vater, Schröder-Abé, Schütz, Lammers, & Roepke, 2010; Zeigler- Hill, 2006). Perhaps the most extreme reductionism of the NLE to an initial preference is illustrated by Stieger and Burger's (2012) referral to a name-letter-preference-test used to measure preferences for non-initials as an 'IPT-non-initial'.

Besides preferring name-letters, people also overestimate the frequency of their name-letters in everyday language (Hoorens & Nuttin, 1993; replicated for initials by Oppenheimer, 2004, Study 3). Inconsistent with the possibility that the NLE is an epiphenomenon of the enhanced subjective familiarity of name-letters, however, people who particularly like their name show a stronger preference for their name-letters but do not overestimate the frequency of their name-letters more than people who do not particularly like their name (Gebauer, Riketta, Broemer, & Maio, 2008; Hoorens, 1990a). The relationship between name liking and name-letter

preferences occurred both when name-liking was assessed through self-reports and when it was assessed indirectly, namely, via a signature size measure (Figure 1).

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Insert Figure 1 about here

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## Name-Letter Preferences as Indirect Measures of Self-Esteem

Researchers use the term "indirect" or "implicit" self-esteem measures to denote measures not relying on self-report (in contrast to "direct" or "explicit" measures, which do rely on self-report). Some also use the term "implicit self-esteem" to express the idea that indirect or implicit measures assess non-conscious aspects of self-esteem. Other researchers have pointed out that, whereas indirect measures assess self-esteem without asking people how they feel about themselves, this does not imply that the aspects of self-esteem being measured are non-conscious (see De Houwer, Teige-Mocigemba, Spruyt, & Moors, 2009, for a normative analysis of implicit measures). As Buhrmester et al. (2011) have articulated, indirect measures may simply measure aspects of self-esteem that people are unwilling to report or that they cannot express on questionnaires. Given the ambiguity surrounding the meaning of the obtained scores (see also Falk & Heine, 2014), I use the term "indirectly measured self-esteem" while avoiding the term "implicit self-esteem".

Many researchers use name-letter preferences (mostly derived from the letter rating task) to indirectly measure self-esteem. If proven valid, name-letter measures have advantages over other indirect measures. Letter rating tasks are easy to prepare and administer, thus lending themselves to self-administration. They can be applied in various manners (Stieger, Voracek, & Formann, 2012) so that they can be adapted to various data collection contexts. Moreover, they

do not necessitate computer equipment or extensive coding and require little of respondents' time. As such, they are uniquely suited for use in large samples and outside the laboratory. As shown by Hoorens et al. (2014), name-letter tasks allow repeated measurements, even with brief intervals. Moreover, preference scores for initials seem more reliable than other indirect measures of self-esteem (Bosson, Swann, & Pennebaker, 2000; Stieger, Voracek, & Formann, 2012; see, however, Rudolph, Schröder-Abé, Schütz, Gregg, & Sedikides, 2008). Indeed, Zeigler-Hill and Terry (2007) referred to them as "the only measure of implicit self-esteem with acceptable psychometric properties […] that can be easily administered in a large group" (p. 143).

Yet, at least four factors limit current knowledge about the value of name-letter preference scores. First, the validity of indirect measures – including letter preferences – is inherently hard to assess (Stieger, Preyss, & Voracek, 2012). Second, an overwhelming majority of researchers have examined preferences for initials only. Third, little research has been done on the relationship between criterion variables and name-letter preference scores obtained through different algorithms. Fourth, most researchers have not addressed the question whether name-letter preferences tap into state- versus trait-aspects of self-esteem. I discuss these issues below.

**Assessment of Validity**

Assessing the validity of indirect measures of self-esteem is challenging (Stieger, Voracek, & Formann, 2012). Correlations between indirect measures can attest to the construct validity of instruments only to the extent that the validity of the chosen criterion measure has consensually been established. At this point, not a single indirect measure of self-esteem has this privileged status. This even holds true for the Implicit Association Test, which has acceptable reliability but which, just like other indirect measures, shows low correlations with other indirect measures and has provoked critical validity questions (Bosson et al., 2000; De Raedt et al., 2006;

Falk & Heine, 2014; Remue, De Houwer, Barnes-Holmes, Vanderhasselt, & De Raedt, 2013). Until research clarifies which aspects of self-esteem various indirect measures assess, therefore, low correlations between indirect measures are hardly informative (Zeigler-Hill & Jordan, 2010).

Self-report measures cannot unequivocally serve as criterion variables, either. If direct and indirect measures assess different aspects of self-esteem there is no reason to expect a strong correlation between name-letter preference scores and scores on self-esteem questionnaires (Falk & Heine, 2014). Even if the crucial difference between indirect and self-report measures is that the former are less subject to self-presentation tendencies than the latter (Olson, Fazio, & Hermann, 2007), correlations between name-letter preferences and scores on self-esteem questionnaires may be modest at best. Congruently with this assertion, a recent meta-analysis found an average correlation of no larger than .12 between preference scores for initials and scores on the Rosenberg Self-Esteem Scale (Krizan & Suls, 2008; see also Sava et al., 2011; Randolph-Seng & Gardner, 2013, for similar values).

As suggested by Koole and Pelham (2003), the question should perhaps be not *whether* but *when* name-letter preferences are associated with directly measured self-esteem. A handful of studies addressed this issue. They revealed stronger correlations between self-esteem measured through preferences for initials on the one hand and directly measured self-esteem on the other hand in circumstances that discouraged extensive conscious tailoring of responses to self-report measures. On a rare occasion where a study used preferences for all name-letters, name-letter preference scores predicted the extent to which participants rated positive traits as being self-descriptive only among participants who worked on the trait rating task relatively quickly (Koole et al., 2001, Study 3) or among participants who rated the traits under cognitive load (Koole et al., 2001, Study 4). Similarly, LeBel (2010) obtained a positive correlation between preferences

for initials and explicitly measured self-esteem among participants who showed short response times on the latter scale. Koole et al. (2009) observed that meditation, which presumably facilitates people's reliance on accessible feelings while describing their self-views, accounted for a positive correlation between preferences for initials and scores on the Rosenberg Self-Esteem Scale.

The correlation between name-letter preference scores and direct measures of self-esteem has also been reported to be higher if participants fill out the direct measure first than if they do the letter rating task first (Krizan & Suls, 2008). One reason, as suggested by the authors, is that thinking about the self strengthens the accessibility of conscious name-associations. The great lengths other researchers went to disguise even that they were interested in letter preferences (e.g., by claiming that the rating task was about "symbols" rather than about letters) suggests that such associations are considered problematic. The rationale seems to be that own-name associations lead participants to guess that the researcher is interested in these associations; as a result, participants identify the task as a self-esteem measure and become tempted to "fake" name-letter preferences. None of these assumptions has been put to test. In fact, suggestive evidence exists for the idea that full conscious awareness of the self-relatedness of stimuli may reduce rather than enhance their judged attractiveness (Epstein, 1955; Huntley, 1940; Rothstein & Epstein, 1963). During letter rating tasks, moreover, people may think of their name, particularly while viewing their initials, without realizing that their judgments are affected by these letters' occurrence in their name. If they do realize it, they do will not necessarily suspect that it is of any interest to the researcher – let alone that they will identify the task as a self-esteem measure.

Given the difficulties surrounding validity assessments of of name-letter scores through their correlations with other self-esteem measures, researchers have turned to examining the extent to which name-letter scores predict behaviours that are known or assumed to be associated with self-esteem. One recent meta-analysis (Buhrmester et al., 2011) showed that preferences for initials predict a variety of states and behaviours that are not only intuitively related to self-esteem, but have also been shown to be associated with self-report measures. Specifically, preference scores for initials correlate negatively with contingent self-esteem and with uncontrollable negative thoughts about the self, and positively with preferences for positive over negative feedback, and the tendency to interpret ambiguous information in a benign manner.

In other studies, preferences for initials predicted a range of behaviors whose relationship with self-esteem may not be that straightforward or intuitive but which are either theoretically relevant to self-esteem or have been shown to be associated with it. For example, after making a choice among different objects people tend to uprate the chosen object. One explanation, namely, that chosen objects become associated with the self, predicts that people with higher self-esteem upgrade chosen objects more than those with lower self-esteem. Consistent with this prediction, a stronger preference for one's initials is associated with more upgrading of chosen objects (Gawronski et al., 2007, Studies 3 & 4).

High self-esteem is also thought to be associated with well-being. Interestingly, preferences for initials are positively correlated with psychological well-being and positive affect, and negatively with indirectly measured depression (Buhrmester et al., 2011; Creemers, Scholte, Engels, Pieters, & Wiers, 2013). Preferences for initials are also negatively correlated with maladaptive perfectionism (a desire to achieve impossibly high goals, associated with an intense need to avoid failure; Zeigler-Hill & Terry, 2007). Preferences for initials even predict how

positive life events affect people's well-being. Whereas such life events are beneficial to many people, they can disrupt the identity of those with low self-esteem and thus become stressful. Positive life events are therefore expected to enhance the physical and mental health of people with high self-esteem and harm the physical and mental health of those with low self-esteem. Interestingly, this pattern occurs also when self-esteem is measured with preferences for one's initials rather than via self-reports (Shimizu & Pelham, 2004).

Some behaviours have been identified as defensive reactions to stressors. For example, having a meaningful and culturally shared worldview reduces the psychological threat of death (Solomon, Greenberg, & Pyszczynski, 2004). Experiences that enhance the salience of one's mortality therefore lead people to cling more forcefully to their worldviews. Given that self-esteem is assumed to buffer against mortality threat as well (Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004), experiences that enhance mortality salience are assumed to provoke weaker worldview defense among people with high self-esteem than among people with low self-esteem. Consistent with the idea that preferences for initials reflect self-esteem, people with stronger preferences for initials show weaker worldview defense (Schmeichel et al., 2009; Study 1).

Preferences for initials are also frequently used as indirect self-esteem measures in studies on the effects of discrepancies between directly and indirectly measured self-esteem. In these studies, behaviours that are theoretically associated with such discrepancies show the predicted pattern. In particular, the combination of high directly measured and low indirectly measured self-esteem ('fragile' or 'defensive' self-esteem) is thought to be associated with intense reactions to threat. When preferences for initials are used to measure indirectly self-esteem, fragile self-esteem predicts greater verbal defensiveness (Kernis et al., 2008), lower forgiveness against

transgressors (Eaton, Struthers, Shomrony, & Santelli, 2007), higher narcissism (Zeigler-Hill, 2006), weaker use of mate-retention strategies by men (Zeigler-Hill, Fulton, & McLemore, 2012), and stronger unrealistic optimism (Bosson et al., 2003).

The combination of low directly measured and high indirectly measured self-esteem ('damaged' self-esteem) is also thought to be associated with problematic behaviours. When preferences for initials are used as the indirect self-esteem measure, damaged self-esteem predicts internet addiction (Stieger & Burger, 2010), self-defeating humour (a humour style thought to reflect defensive denials and positively correlated with depression, anxiety, and other psychiatric and somatic problems; Stieger, Formann, & Burger, 2011), perfectionism (Zeigler-Hill & Terry, 2007), depressive symptoms, suicide ideation, and loneliness (Creemers et al., 2012). In addition, both fragile and damaged self-esteem predict borderline symptoms (Vater et al., 2010; see, however, Steinberg et al., 2007) and defensive interpersonal reactions (Schröder-Abé et al., 2007). Overall, then, preferences for initials predict self-esteem-related behaviours. As I will explain later, preferences for *all* name-letters could do even better.

**A One-Sided Focus on Initials**

The vast majority of studies using name-letter preferences to measure self-esteem have examined preferences for initials rather than for all name-letters. Some researchers have justified this choice by pointing out that the NLE is stronger for initials (DeHart, Pelham, Fiedorowicz, Carvallo, & Gabriel, 2011; Stieger & LeBel, 2012). This argument rests upon the assumption that the stronger the average name-letter preference is, the more variability in name-letter preferences reflects individual differences in self-esteem.

In fact, there are no theoretical or psychometric reasons to assume that the occurrence of meaningful variability should depend on the level of the group average. Individual differences in

name-letter preferences may well reflect individual differences in self-esteem without the group average showing a general preference for name-letters – just like Rosenberg Self-Esteem scores may reflect individual differences in self-esteem within a group of participants even if the group average does not reflect generally elevated self-esteem. Illustrating this point, Kernis et al. (2008) found a relatively strong correlation between explicitly measured self-esteem and preferences for initials as compared to other published research even though their study was one of the few that did not produce a NLE on a group level.

To examine the relationship between preferences for initials, preferences for non-initials, and directly measured self-esteem more systematically, in one study (Hoorens, 2014) I presented 342 participants (282 women, 60 men; aged 17-29, $M$ = 18.40, $SD$ = 1.10; four participants did not indicate their initials or non-initials, leaving a sample of 338) with a letter rating task and a direct measure of trait self-esteem (Dutch version of the Revised Self-Liking and Self-Competence Scale; Tafarodi & Swann, 2001; Vandromme, Hermans, Spruyt & Eelen, 2007). I calculated preference scores through seven different algorithms. The simplest algorithm (which, to the best of my knowledge, had not been reported in the literature) merely involved subtracting the scale midpoint from the name-letter ratings. The other algorithms were six frequently used algorithms: the baseline-correction algorithm (two versions), the self-correction algorithm (two versions), the double-correction algorithm, and the ipsatized double-correction algorithm. In the case of the baseline-correction algorithm, the letter baselines were calculated on the basis of all participants' ratings (baseline-all) or with letter baselines calculated on the basis of participants for whom the letters were no name-letters only (baseline-NNLs). In the case of the self-correction algorithm, the individual baselines were derived from the participant's ratings of all remaining

letters (self-all) or from the participant's ratings of non-name-letters only (self-NNLs). For all these algorithms, scores above zero reveal a name-letter preference.

As shown in Table 2, all algorithms yielded significant NLEs for both initials and non-initials. Preferences for initials were stronger than preferences for non-initials regardless of the manner in which name-letter preference scores were calculated. Still, directly measured trait self-esteem did not correlate more strongly with preferences for initials than with preferences for non-initials. The study thus yielded no evidence that a stronger NLE goes hand in hand with a stronger relationship with directly measured self-esteem.

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Insert Table 2 about here

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Table 2 also includes information on the correlation between preference scores for initials and preference scores for non-initials. The correlation was always significant, but surprisingly modest for scores that would be assumed to tap into the same aspect of self-esteem. The correlation was even lower when scores were calculated through the self-all-correction algorithm than when they were calculated through any other algorithm (self-all-correction versus double-correction: $z = 1.88$, two-tailed $p = .06$; self-all-correction versus any other algorithm: $z$s $> 3$, $p$s $< .002$). The explanation for this pattern is straightforward. When preferences for initials are corrected on the basis of ratings for *all* letters, including name-letters, the correction also removes genuine variability in preferences for non-initial name-letters. By consequence, the obtained preference scores reflect differences between participants in terms of how they evaluate their initials as compared to non-name-letters but also in terms of how they evaluate their initials as compared to non-initial name-letters. The latter source of variation may be interesting in itself,

but does not directly bear on the question whether name-letter preferences indicate individual differences in self-esteem.

The relatively modest correlation between preference scores for initials and non-initials dovetails with previous findings suggesting that preferences for initials versus non-initials tap into related yet distinct constructs. In one study, preferences for one's first name initial correlated more strongly with directly measured self-esteem among participants who thought of their name while juding their initial than among participants who were not. No such difference occurred for other name-letters (Stieger & Burger, 2012). Signature size—an indirect measure of own name attachment—is associated with general name-letter preference (Hoorens, 1990a; Figure 1) but not with initial preference (Randolph-Seng & Gardner, 2013). Narcissism correlates negatively with name-letter preferences and positively with preferences for initials (Gregg & Sedikides, 2010; Sakellaropoulo & Baldwin, 2007).

The dissociation between preferences for initials and non-initials may not be surprising, given that initials and non-initial differentially provoke own-name-associations. In one study, I presented participants with six letters – three from their first name (1 initial and 2 non-initials) and three from a yoked participant's first name – and allowed them 1 minute per letter to write down any words that came to their mind while seeing the letter (Hoorens, 1990a, Study 6). Of a total of 146 participants, 95 wrote down a first-name-association to their initial, whereas 0 participants did so to a non-initial. After writing down the words that came to mind while seeing the letters, participants were asked to judge the relevance of each of these associations to themselves. They judged the associations to their initial as being more self-relevant than the associations to their yoked partner's initial, but did not judge the associations to their non-initials

as being more self-relevant than the associations to their yoked partner's non-initials (see Krizan, 2008, for a conceptual replication).

It seems, then, that preferences for initials and non-initials differ markedly. With initials provoking self-related associations, an initial preference score may reflect the extent to which people value self-related stimuli that they consciously associate with the self. With non-initial name-letters rarely provoking self-related associations, a non-initial preference score may reflect the extent to which people value self-related stimuli that they do not consciously associate with the self. An exclusive focus on initials may thus yield an impoverished indicator of self-esteem (Buhrmester et al., 2011).

Interestingly, several researchers have justified the relatively low reliability of preference scores for initials as compared to direct measures of self-esteem—both in terms of test-retest reliability and internal consistency—by noting that preference scores for initials are typically calculated on the basis of just two initials so that no higher reliability can reasonably be expected (Bosson, 2006; Bosson et al., 2000; Buhrmester et al., 2011; Gailliot & Schmeichel, 2006; Krause, Back, Egloff, & Schmukle, 2011; LeBel & Gawronski, 2009; LeBel & Paunonen, 2011; Pöhlmann & Hannover, 2006; Rudolph et al., 2008). If this is true, then one straightforward manner to increase reliability is to calculate scores on the basis of all name-letters rather than of initials alone (LeBel & Paunonen, 2011; Pöhlmann & Hannover, 2006). Supporting this argument, uncharacteristically high internal consistencies have been reported when all name-letters were included (.56 to .70 in Koole et al., 2001; .68 in Gregg & Sedikides, 2010).

Within the context of a study on the relationship between depression and self-esteem, Hoorens et al. (2014) tested the reliability of preference scores for initials as well as for non-initials and all name-letters. They had participants fill out seven daily letter rating tasks, and then

calculated correlations between preferences for all possible pairs of days for general name-letters and for initials and non-initials separately. In keeping with other published studies on self-esteem and depression, they calculated name-letter preference scores with the baseline algorithm. For initials, the test-retest correlations of baseline-corrected scores (correlations between scores on two different days) varied from .53 to .79. For non-initials, these correlations varied between .68 and .88. For all name-letters together, they varied from .68 to .89. Hoorens et al. also calculated correlations between preference scores for name-letters (initials and non-initials separately) of the first name and of the last name. Depending on day of measurement, the first-last correlation varied from .39 to .62 for initials, from .64 to .79 for non-initials, and from .67 to .82 for all name-letters. Admittedly, the correlations for general and non-initial letters are inflated, because first and family names often share multiple letters. Still, suggesting that name-letter preference scores are more reliable than preference scores for initials, the inclusion of non-initials did not weaken internal consistency and did enhance test-retest reliability.

**Getting Lost in a Forest of Algorithms**

It is probably fair to say that, while applying a given algorithm, researchers have not systematically checked whether the attempted corrections were necessary (see Albers et al., 2009, for a rare exception). Some researchers seem to have a favorite algorithm that they routinely apply. Others have selected different algorithms for specific studies. For example, one research group used the self-correction algorithm in some parts of their work (Creemers et al., 2012) and the baseline-correction algorithm in other parts (Creemers et al., 2013) without explaining the switch. Still, it is worth examining whether a given correction is called for.

Stating that name-letter ratings need to be corrected for letter baselines rests upon two assumptions. First, letters differ in how attractive people generally find them. Second, people

whose names contain relatively attractive letters are likely to show a preference for their own name-letters, whereas those whose names contain relatively unattractive letters are unlikely to show such a preference, thus creating spurious differences in own-name-letter liking. The one determinant of letter attractiveness that is almost always mentioned within this context is letter frequency. Virtually all researchers cite the same two studies on the relationship between letter frequency and letter attractiveness ratings: Alluisi and Adams (1962), and Anderson (1965). I am not aware of published studies in which authors examined whether letter frequency predicted letter ratings prior to applying corrections for letter baselines.

In Hoorens (2014), therefore, I calculated correlations between letter ratings and letter frequency indices. I borrowed data regarding letter frequencies in Dutch (participants' native language) from Broecke (1988), the most recent published study on Dutch letter frequencies. Per letter I noted which percentage it represented of all letters used in Dutch as well as its rankorder in the frequency hierarchy (with the highest rank value given to the most frequent letter). Of course, the two were highly correlated ($r$ = .87), albeit not perfectly because the difference in percentages between adjacent letters considerably varied.

First, I examined whether the NLE, if assessed through uncorrected letter ratings, is due to mere exposure. To that end, I calculated the mean frequencies of name-letters (separately for initials and non-initials) and non-name-letters. As shown in Table 3, the mean frequency of participants' name-letters was significantly higher than the mean frequency of their non-name-letters. If mere exposure affects letter preferences, an unequivocal demonstration of the NLE as a consequence of mere ownership would require a correction for letter frequencies. Intriguingly, however, the mean frequency of non-initials was also significantly higher than the mean frequency of initials – a finding that stands in contrast with the NLE being weaker for non-initials

than for initials. To examine whether individual differences in name-letter preferences were associated with the differential frequency of name-letters, I calculated the correlations between name-letter ratings, name-letter frequency percentages, and name-letter frequency rankorders. Surprisingly, these correlations were near zero (.01 for percentages and -.02 for rankorders). In this particular dataset, therefore, reducing the correlation between name-letter preference scores and letter frequencies was unnecessary and, in fact, impossible (neither, for that matter, did any algorithm significantly inflate it). This finding shows that the role of mere exposure in preferences for name-letters may not always be as large as usually assumed, so that correcting name-letter ratings for letter baselines may not always be necessary.

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Insert Table 3 about here

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Asserting that name-letter ratings need to be corrected for individual baselines also rests upon two assumptions. First, name-letter ratings and non-name-letter-ratings are affected by mood states, response tendencies, and general letter liking. Second, correcting for individual baselines removes this shared variability. To support the idea that name-letter ratings and non-name-letter-ratings share variability that cannot be related to self-attachment, researchers have pointed out that name-letter preference scores are strongly correlated with non-name-letter preference scores (Albers et al., 2009). It follows that the positive correlation between name-letter ratings and non-name-letter ratings should be reduced or even eliminated after the application of an algorithm that corrects raw scores for individual baselines. Inconsistent with this inference, Albers et al. (2009) found that a self-correction algorithm reversed the sign but did not reduce the strenght of the correlation.

I examined this issue by calculating, per algorithm, the correlation between the obtained name-letter ratings and raw name- and non-name-letter scores. The correlations are shown in Figure 2 (of course, the correlation for name-letters was by definition perfect for the raw scores). Suggesting that a correction for individual baselines might be called for, raw name-letter ratings were significantly correlated with raw non-name-letter scores. As expected, algorithms that presumably did not correct for individual baselines neither reduced nor enhanced the correlation between name-letter scores and non-name-letter scores. Except for the double-correction algorithm (which did not influence the correlations), however, all algorithms that presumably corrected for individual baselines reversed the sign but did not reduce the strength of the correlation between name-letter scores and non-name-letter scores. In fact, they significantly enhanced the strength of this correlation (all $z$s > 2.00, all $p$s < .05) while considerably reducing the correlation between name-letter scores and raw name-letter ratings (all $z$s > 42, $p$s < .001). It seems, then, that the self-all, self-NNLs, and double ipsatized algorithms may (at least in some samples) inflate the extent to which name-letter preference scores reflect individual baselines rather than attachment to name-letters.

Surprisingly little research has been done to compare the qualities of various algorithms (for exceptions see Albers et al., 2009; Hoorens, 2014; Krause et al., 2011; LeBel & Gawronski, 2009). Such research is important, however, because the algorithms may produce markedly differing name-letter preference scores. For instance, Table 4 shows the correlations between preference scores for initials and non-initials, as these were calculated through different algorithms (Hoorens, 2014). As becomes evident from these correlations, some algorithms yield name-letter scores that are almost perfectly correlated. At the same time, however, the correlations between scores obtained from algorithms that correct for letter baselines and scores

obtained from algorithms that correct for individual baselines are much weaker—particularly in the case of preference scores for non-initials. It is perhaps not surprising, therefore, that in at least one study fragile esteem predicted self-enhancement when the baseline-correction algorithm was used but not when the self-correct algorithm was used (Bosson et al., 2003; Study 2).

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Insert Table 4 about here

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LeBel and Gawronski (2009) compared the psychometric qualities of the baseline-correction, self-correction, double-correction, ipsatized double-correction, and *z*-transformed double-correction algorithms. They concluded that the ipsatized double-correction algorithm had superior psychometric characteristics. Krause et al. (2011) also compared the ipsatized double-correction algorithm with the baseline-correction algorithm and found that the ipsatized double-correction algorithm was superior (but see Stieger & Burger, 2012, note 10, who did not replicate this finding). Both LeBel and Gawronski (2009) and Krause et al. (2011) therefore recommended that researchers use the ipsatized double-correction algorithm.

However, LeBel and Gawronski (2009) and Krause et al. (2011) did not compare the algorithms on the most important psychometric quality of all, validity. Although reliability is a prerequisite for scores on any test, higher reliability does not always imply better validity. In fact, little is known about whether name-letter preference scores obtained from different algorithms relate differentially to criterion variables. For example, one meta-analysis (Stieger, Voracek, & Formann, 2012) included studies using preference scores for initials that were derived exclusively from the baseline-correction algorithm.

As explained earlier, validating name-letter preference scores is difficult. Still, it is possible to examine their validity via their correlation with explicitly measured self-esteem. Whereas there is no reason to expect for these scores to be strongly correlated with scores on self-report instruments, they might be correlated weakly. Albers et al. (2009) examined these correlations to compare the validity of name-letter preference scores calculated from different algorithms. They studied preference scores for initials calculated via the regression-based algorithm, the baseline-correction algorithm, the baseline-correction algorithm applied after standardizing ratings, and an variation on the double-correction algorithm (subtracting non-name-letter ratings from baseline-corrected ratings of initials rather than dividing these baseline-corrected ratings by non-name-letter ratings). Their conclusion was that scores calculated via the regression-based algorithm had superior psychometric qualities. Still, these scores did not correlate more strongly with explicit self-esteem measures than scores calculated via alternative algorithms did. In fact, it was the baseline-correction algorithm as applied to non-standardized letter ratings that yielded the highest correlation. As explained by Albers et al. (2009), standardizing letter ratings may even remove part of the NLE, because strong preferences for name-letters create larger standard deviations and hence lead to a greater 'correction' of name-letter ratings.

In my study on preferences for initials and for non-initials calculated from seven different algorithms (Hoorens, 2014), I also compared the correlations with explicitly measured self-esteem. I found no significant differences between the algorithms, but two aspects of the correlation pattern were noteworthy. First, not a single algorithm produced correlations that were higher than the correlations produced by the raw-scores algorithm. Second, some algorithms did not yield significant correlations, whereas others did. Non-significant correlations (for both

initials and non-initials) occurred when the self-all-correction, self-NNLs-correction, and ipsatized double-correction algorithms were used. Significant correlations (for initials and/or non-initials) occurred when the raw algorithm, baseline-all-correction, baseline-NNLs-correction, and double-correction were used.

**State or Trait?**

Many researchers distinguish between self-esteem as a stable individual difference, often called trait self-esteem, and temporal or situational self-esteem fluctuations, often called state-self-esteem (Heatherton & Polivy, 1991; Savin-Williams & Demo, 1983; Sedikides & Gregg, 2003; Trzesniewski, Donnellan, & Robins, 2003). Most direct self-esteem measures assess trait self-esteem, but some researchers have adapted self-esteem scales to measure state self-esteem (DeHart & Pelham, 2007) or have used a specifically designed state self-esteem measure (Heatherton & Polivy, 1991). In the case of indirect measures of self-esteem, in contrast, the trait versus state self-esteem issue has largely been left unspecified and unexplored. The handful of researchers who did address the state-trait issue suggested that name-letter preferences reflect self-esteem as a state rather than as a trait. DeHart and Pelham (2007) described the construct being measured as "state implicit self-esteem". Buhrmester et al. (2011) considered name-letter preference scores too unstable to indicate trait self-esteem and therefore suggested that they might be indicative of state self-esteem. In contrast, Creemers et al. (2013) suggested that preferences for initials may have both state- and trait-like characteristics.

Supporting the view that preferences for initials reveal state rather than trait self-esteem, the few studies that examined the effects of experimental manipulations and of real-life circumstances on preferences for initials showed that the latter are susceptible to situational determinants. In an experiment on preferences for both initials and non-initials, a self-affirmation

manipulation strengthened preferences for initials but not for non-initials (Koole et al., 1999, Study 3). Preferences for initials were also strengthened by evaluative conditioning procedures in which self-esteem was enhanced by making self-related words co-occur with smiling faces (Baccus et al., 2004) or positive words (Jraidi & Frasson, 2010) or by having the word 'I' co-occur with positive trait labels (Dijksterhuis, 2004, Study 1; see, however, Dijksterhuis, 2004, Study 2, for a non replication). Moreover, direct self-integrity threats compensatorily enhance preferences for initials. This phenomenon was observed for real-life health threats (Fila-Jankowska & Stachowiak, 2013), mortality salience procedures (Gurari et al., 2009), thoughts of relationship security among anxiously attached people (Peterson, 2014), and—among individuals with high directly measured self-esteem—identity threats (Jones et al., 2002). Preferences for initials are reduced by other stressors, including experimental stress induction procedures (Creemers et al., 2013), negative life events (among people with low directly measured self-esteem: DeHart & Pelham, 2007), the experience of being denied a loan (among societal minority group members whose membership is made salient: Bone, Christensen, & Williams, 2014).

The only study thus far that has examined the relationship of preferences for initials and non-initials with scores derived from trait and state self-report measures of self-esteem is Hoorens et al. (2014). Besides filling out seven daily letter rating tasks and the standard Rosenberg Self-Esteem scale (on the first day of measurement), participants completed daily state versions of the Rosenberg Self-Esteem scale. Per participant, we calculated (a) the average daily preference scores for initials and for non-initials, (b) a trait self-esteem score, (c) an average state self-esteem score over the seven days of measurement. We calculated zero-order and partial correlations between preference scores for initials and non-initials and each type of directly measured self-esteem (with the partial correlations showing the relationship between name-letter

preferences and each type of directly measured self-esteem while controlling for the alternative type of directly measured self-esteem). The correlations are shown in Figure 3. At the zero order correlation level, preference scores for initials and non-initials were both significantly correlated with trait self-esteem and average state self-esteem. The partial correlations showed a somewhat different pattern. Preferences for initials were significantly correlated with average state self-esteem but not with trait self-esteem, whereas preferences for non-initials were significantly correlated with trait but not with average state self-esteem. These differences are the more impressive as it might be tempting to assume that the average of scores obtained on a series of successive self-report measures of state self-esteem should approach scores on a self-report measure of trait self-esteem. Not only does this assumption seem to be invalid, but trait and average state self-esteem are even differentially associated with preferences for non-initials and initials, respectively.

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Insert Figure 3 about here

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## Name-Letter Preference as an Indirect Measure of Self-Esteem: Future Directions

The previous sections have shown that published studies on name-letter preferences are uniform in their focus on initials, but heterogeneous in the algorithms used to calculate preference scores. This section provides suggestions for future research using name-letter preference scores to measure self-esteem.

### Studying Preferences For Both Non-Initials and Initials

Some researchers have justified their choice to limit their study to initials by stating that this approach protects participants' privacy (Verplanken, Friborg, Wang, Trafimov, & Woolf,

2007, Study 6). They thereby identify a real problem. In the early days of the NLE, even scrupulous scientists would have agreed that there was no privacy threat involved in revealing that people generally prefere name-letters. This situation has changed since researchers have started using name-letter preferences to measure self-esteem. Of course, the consideration that people might object to broadcast unwittingly their level of self-esteem is relevant to all indirect measures. With name-letter preferences, however, the anonymity of individual scores cannot be guaranteed as readily as with other measurements (Shimizu & Pelham, 2004). Identifiable data are vulnerable to violations of confidentiality not only during the data collection and analysis, but also during the whole cycle of publication, sharing, storage, and, ultimately, disposal—even if formal ethical guidelines prescribe that names be removed from data-files.

As explained earlier in this article, however, limiting the analysis of name-letter preferences to initials implies unfortunate limitations to reliability and validity. One solution for the privacy issue involved in research on all name-letters may be to ask participants to indicate their name letters (perhaps distinguishing between initials and non-initials) rather than writing their full names (Claes & Hoorens, 2013; Stieger & Burger, 2012; Van Damme, Hoorens, & Sedikides, 2013). In small samples, name-letter information in principle allows matching the names on informed consent forms with the name-letter information (Stieger & Burger, 2012, who still observed privacy concerns among participants). In large samples, however, and particularly in mass testing sessions, matching names ultimately becomes impossible—thus guaranteeing participants' anonymity.

**Choosing An Algorithm: Back To Basics?**

Increasingly varied and complicated algorithms come with a cost. They may discourage researchers from using letter preference tasks and render studies hard to compare, thus hindering

the accumulation of knowledge (LeBel & Gawronski, 2009). It is therefore important to contemplate what the calculation of name-letter preference scores has to gain from them. Researchers might want to answer three questions before applying a algorithm. First, they could ask whether the relevant confound occurs in their data. Second, they could ask whether the algorithm eliminates the confound rather than leaving it unaffected or enhancing it. Third, they could check whether the algorithm inadvertently enhances other confounds.

A related issue concerns transformations (e.g., logarithmic) that researchers use to adjust non-normally distributed data before applying parametric tests. Received wisdom stats that such transformations be implemented if there is evidence of violation of statistical assumptions , if the transformation mitigates this problem, and if the transformation does not introduce new statistical problems (Osborne, 2002). To be sure, name-letter preference algorithms have to do with conceptual rather than statistical issues. A similar reasoning applies, however. Researchers, then, will do well to address these three transormation preconditions and implement only those algorithms that correct for observed confounds without introducing new confounds.

**A Note On Dealing With Identical Letter Ratings**

Researchers using letter preference tasks unavoidably encounter the problem that some participants give the same rating to all letters. Some authors deal with this pattern by considering it indicative of non-compliance and by excluding those participants (LeBel & Gawronski, 2009; Stieger & LeBel, 2012; Stieger & Burger, 2012). However, identical letter ratings may also reflect indecisiveness or unclarity on the part of respondents. If so, excluding participants may distort the results. A defensible practice therefore may be to exclude participants only if they give identical answers on other questionnaires as well. Of course, an even better practice would be to discourage participants from expressing noncompliance via identical ratings. For example, they

can be instructed that non-responding to a few questions, as they see fit, is more helpful than providing identical ratings across the board.

## Conclusion

Although the NLE initially met with skepticism, it is now well-established as a demonstration of self-attachment. In the mid-90s, the search for valid indirect measures of self-esteem lead researchers to examine individual differences in name-letter preferences. These individual differences can predict behaviours that are theoretically or empirically related to self-esteem. It is still unclear whether name-letter preferences reflect non-conscious aspects of self-esteem or conscious aspects that participants are unable or unwilling to disclose in direct measures, and little research has addressed the question whether these aspects may be either trait- or state-like. The little research that does exist suggests that these aspects may be different for preferences for initials versus for non-initials.

Given the current state of knowledge, a set of recommendations for researchers using letter rating tasks is to: (a) test whether it is necessary to control for confounds and apply only those corrections that are necessary, (b) specify how the algorithm of choice was calculated, (c) use non-name-letter ratings only to calculate individual and letter baselines, even when an algorithm is used to examine preferences for initials, and (d) most importantly, examine name-letter preferences for non-initials as well as for initials.

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Table 1

*Percentage of name- and non-name-letters chosen among the six most attractive letters by native and non-native users of the Roman, Cyrillic, and Thai alphabet (native language between brackets; data from Hoorens, 1990; Bulgarian sample: also Hoorens & Todorova, 1988; Thai sample: also Hoorens, Nuttin, Erdélyi-Herman, & Pavakanun, 1990).*

| | Native alphabet | | | Non-native alphabet | | |
|---|---|---|---|---|---|---|
| Letter category | Roman (Polish) | Cyrillic (Bulgarian) | Thai (Thai) | Roman (Bulgarian) | Roman (Thai) | Cyrillic (Polish) |
| Name | 31.94* | 34.04* | 23.39* | 30.55* | 27.68* | 19.71 |
| Non-name | 21.93 | 18.09 | 12.51 | 21.05 | 21.40 | 18.12 |

* Significantly lower than corresponding non-name-letter proportion at least at $p < .01$

Table 2

*Preference scores for initials (INs) and non-initials (NINs) and correlations between preference scores for INs, NINs, and explicity measured trait self-esteem (SE) for seven algorithms (Hoorens, 2014).*

| | Mean preference scores | | Correlations | | | |
|---|---|---|---|---|---|---|
| Algorithm | INs[1] | NINs | INs-SE | NINs-SE | NLs-SE | INs-NINs[2] |
| Raw | .71* (.88) | .35* (.61) | .10 | .13* | .13* | .34[bc] |
| Baseline-NNLs | .63* (.86) | .29* (.60) | .10 | .12* | .13* | .39[cd] |
| Baseline-all | .48* (.86) | .08* (.60) | .11* | .12* | .13* | .39[cd] |
| Double | .14* (.21) | .06* (.15) | .08 | .12* | .12* | .25[ab] |
| Self-NNLs | .73* (.93) | .37* (.66) | .06 | .08 | .08 | .43[c] |
| Self-all | .59* (.84) | .22* (.48) | .05 | .08 | .08 | .11[a] |
| Ipsatized double | .78* (.91) | .41* (.65) | .07 | .07 | .07 | .47[d] |

** Greater than zero, thus showing a preference for name-letters, at $p \leq .05$.*
*[1] Scores for initials always exceed those for initials; ts > 6.8; df = 337; ps < .001.*
*[2] Correlations significant at p < .05 or better. Correlations that do not share a superscript significantly differ from each other.*

Table 3

*Mean frequencies of and raw preference ratings for non-name-letters, initials, and non-initials (Hoorens, 2014).*

| | Frequency | | Preference (raw) |
|---|---|---|---|
| | Percentage | Rankorder | |
| Non-name-letters | 2.51 (0.41) | 10.83 (0.97) | -0.02 (.60) |
| Initials | 4.12 (2.43) | 15.10 (3.75) | 0.71 (.88) |
| Non-initials | 7.02 (1.31) | 19.35 (2.14) | 0.34 (.61) |

Higher values denote greater frequency/preference. Within columns, all values differ at $p < .001$.

Table 4

*Correlations between preference scores for initials (above diagonal) and non-initials (below diagonal) as calculated through seven algorithms (Hoorens, 2014).*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1. Raw | - | .97 | .97 | .95 | .79 | .83 | .75 |
| 2. Baseline-NNLs | .99 | - | 1.00 | .98 | .75 | .78 | .77 |
| 3. Baseline-all | .99 | 1.00 | - | .97 | .74 | .77 | .77 |
| 4. Double | .95 | .96 | .96 | - | .80 | .83 | .83 |
| 5. Self-NNLs | .56 | .54 | .54 | .56 | - | .98 | .97 |
| 6. Self-all | .59 | .57 | .56 | .59 | .98 | - | .94 |
| 7. Ipsatized double | .55 | .55 | .55 | .56 | .99 | .97 | - |

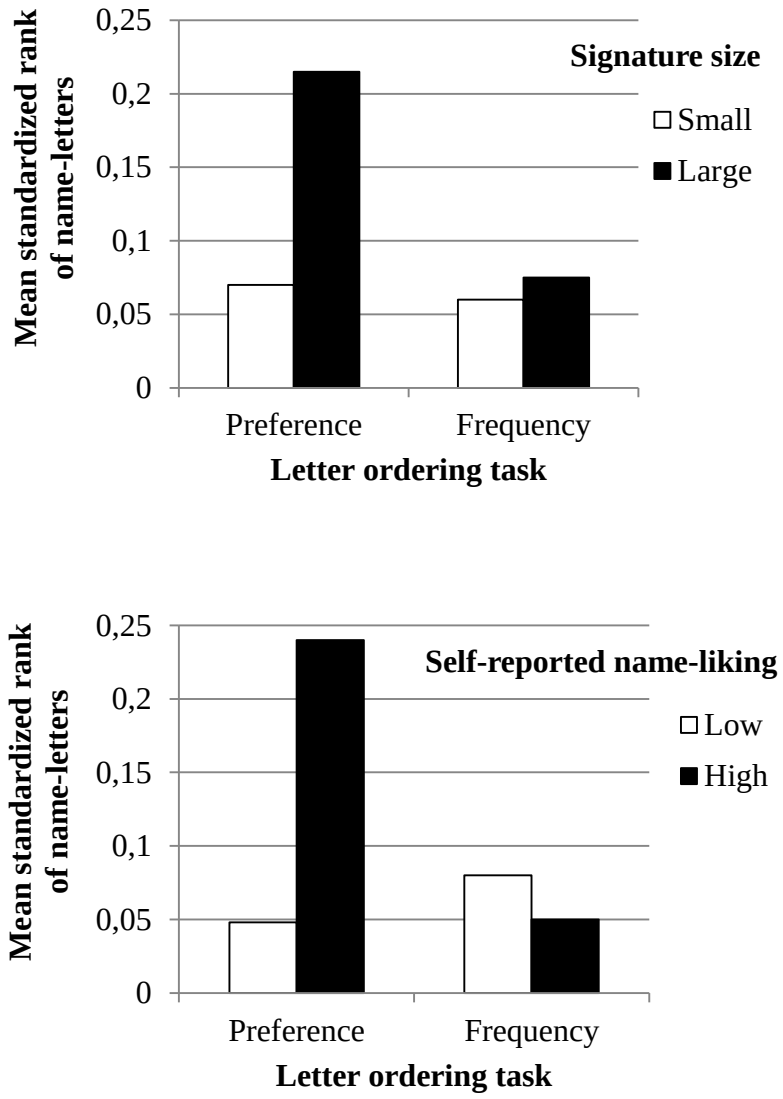


*Figure 1.* Mean standardized rank order of name-letters in personal preference and frequency hierarchies as a function of own name liking, with name liking being measured through signature size (upper panel) or self-reports (lower panel). Higher values denote stronger preference or higher frequency (data from Hoorens, 1990a; self-report data: also Hoorens & Nuttin, 1993).

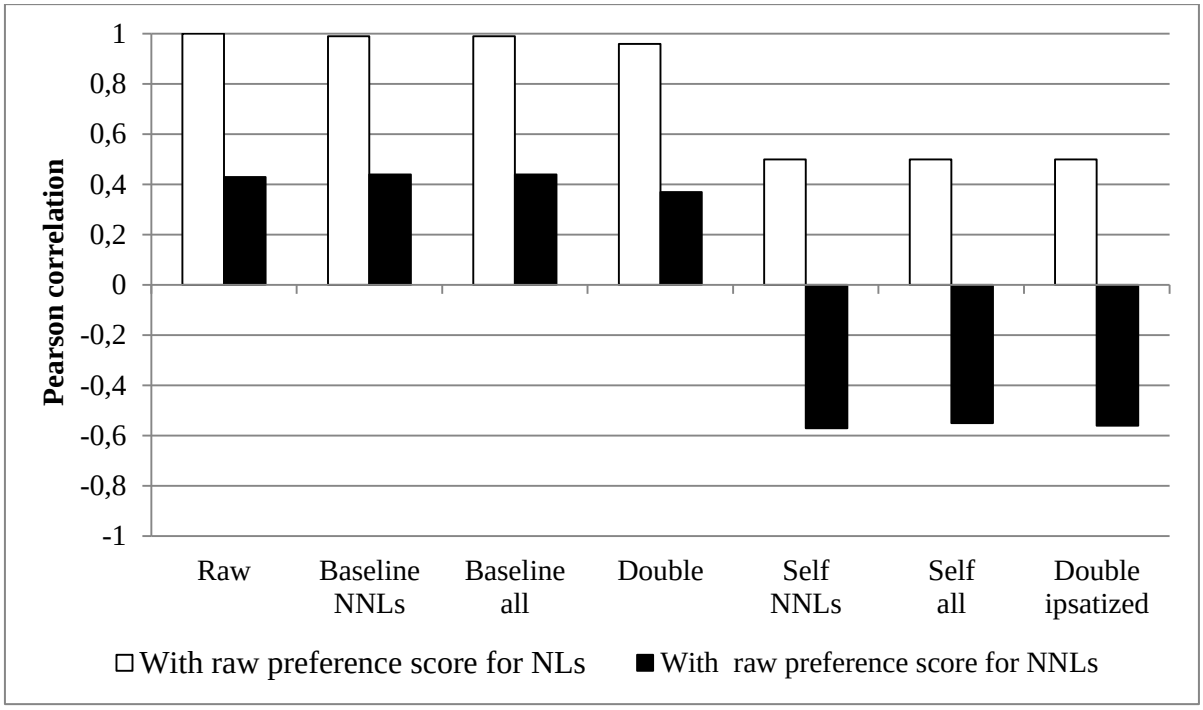


*Figure 2.* Correlations with raw ratings for name-letters (NLs) and non-name-letters (NNLs) of NL-preference scores as calculated through seven algorithms; all correlations significant at $p <$ .001 (Hoorens, 2014).

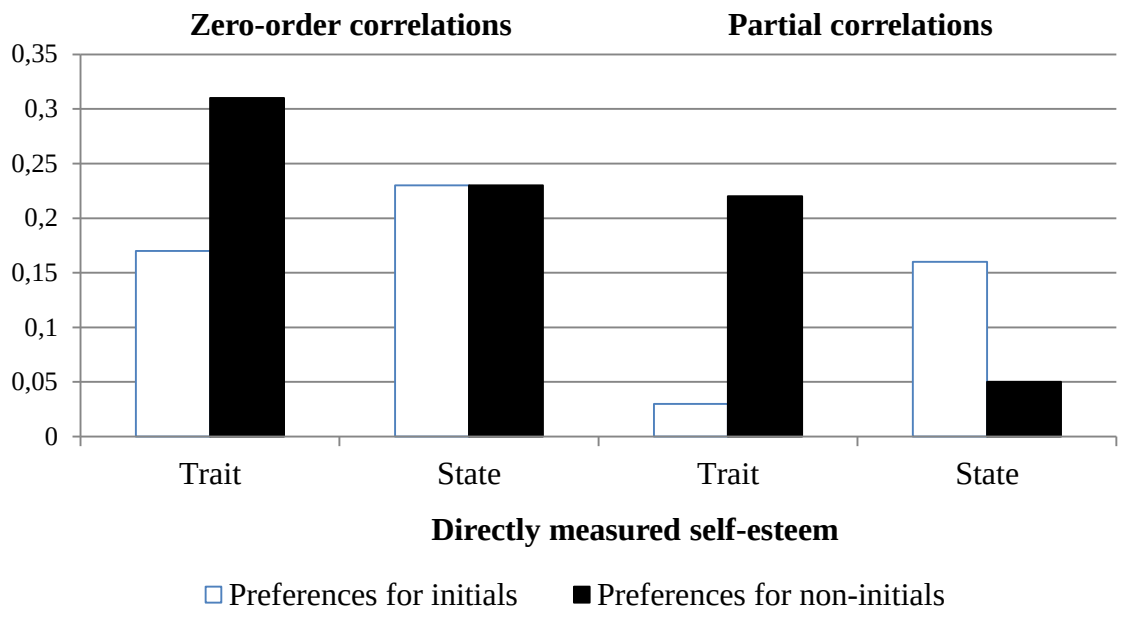


*Figure 3.* Zero- order and partial correlations of preference scores for initials and for non-initials with explicitly measured state and trait self-esteem (based on data from Hoorens, Takano, Franck, Roberts, & Raes, 2014).