



## Unrelated look-alikes: Replicated study of personality similarity and qualitative findings on social relatedness

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### ABSTRACT

Twin research critics assert that similar treatment of monozygotic (MZ) twins results from their matched physical appearance, and that their similar treatment explains their within-pair behavioral similarities. A genetic explanation of MZ twins' resemblance is, thereby, dismissed. To address this challenge, Segal (2013) found a lack of similarity in personality and self-esteem in pairs of unrelated look-alike individuals. The present study describes a constructive replication of that work, confirming these findings. It also presents an analysis of social relatedness within U-LA pairs. Most participants expressed moderate to little social closeness and familiarity, upon meeting and subsequently, over an average 8.98 year period ( $SD = 7.82$ ). A qualitative analysis of U-LAs' responses to unstructured social relationship questions further explored their perceptions of, and responses to, their physical resemblance. Participants were generally divided as to perceptions of "some" physical resemblance and "no" physical resemblance upon meeting; two-thirds indicated "some" resemblance at the time of the study. Reactions to their physical resemblance were distributed among positive reactions, negative reactions and within-pair contrasts. Theories addressing the bases of social relatedness provide context for these findings.

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### 1. Introduction

The use of twin studies for disentangling genetic and environmental influences on behavioral and physical traits has increased in recent years (Segal, 2012). Greater similarity between monozygotic (MZ) twins than dizygotic (DZ) twins is consistent with genetic influence on the trait(s) in question. Nevertheless, critics assert that MZ twin resemblance in behavior is best explained by their more similar treatment due to their greater physical resemblance, relative to DZ twins. Such criticisms are raised periodically despite contrary evidence (see Palmer, 2011; Segal, Gottesman, Martin, Turkheimer, & Gatz, 2011).

A recent attempt to address this criticism compared similarity in personality and self-esteem in pairs of unrelated look-alike individuals (U-LAs) with that of MZ and DZ twins reared apart (MZA and DZA) and together (MZT and DZT) (Segal, 2013). It was reasoned that if similar treatment is responsible for MZ twins' behavioral resemblance, the magnitude of the correlations for U-LAs should approach that of MZ twins. Alternatively, if genetic influence substantially affects behavioral variation then the U-LAs' correlations should fall significantly below those of MZ twins. The

second alternative would identify reactive gene-environment correlation, i.e., the process by which people respond to individuals' genetically based behavioral characteristics (Plomin, DeFries, McClearn, & McGuffin, 2008), as responsible for MZ twins' similar treatment.

Support for the second alternative was provided by mean U-LA intraclass correlations of  $-.05$  and  $-.03$  for the Big Five personality traits and self-esteem, respectively. In contrast, mean MZA and MZT correlations for the Big Five traits were  $.53$  and  $.48$ , respectively. Correlations for self-esteem were  $.30$  for MZT males and  $.35$  for MZT females, exceeding that found for U-LAs. These findings support genetic contributions to individual differences in personality and self-esteem. Additional personality data for the U-LA pairs enabled constructive replication of that analysis.

#### 1.1. Physical resemblance and social relatedness

A second aim of this study was to assess self-reported feelings of social closeness and familiarity in U-LAs, compared with MZA and DZA twin pairs. The social attraction that may occur between individuals brought together due to their physical resemblance, as perceived by others, has never been examined. U-LA pairs offered a novel opportunity to assess the social outcomes of nearly physically identical individuals who show negligible personality and self-esteem resemblance.

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## 1.2. Theories of social relatedness

A diverse literature includes social–psychological, behavioral–genetic and evolutionary based studies linking social attraction with perceptions of physical similarity in biological and non-biological kin. These perspectives are considered below.

### 1.2.1. Social–psychological

Similarity–attraction theory, defined by *Byrne* (1971), examines associations between phenotypic similarities and social attraction. Members of social networks, including friends, spouses and co-workers, show similarities in socio-demographic measures (e.g., age and social class), behavioral measures (e.g., achievement and political practice) and intrapersonal characteristics (e.g., attitudes and values) (*McPherson, Smith-Lovin, & Cook, 2001*). Spouses who had been together longer showed greater similarity in perceived facial personality traits, relative to spouses who had been together for shorter periods (*Little, Burt, & Perrett, 2006*). In addition, college friends correlate positively and significantly across various attitudes and behaviors, including gender role attitudes and racial prejudice (*Bahns, Pickett, & Crandall, 2011*).

Associations between behavioral similarity and social attraction also characterize children's social networks. *Rubin, Lynch, Coplan, Rose-Krasnor, and Booth* (1994) found that children preferred those who displayed similar forms of social participation and cognitive play. Resemblance between adolescent friends on gender, race, attitudes and personality has also been documented (*Clark & Ayers, 1992*). *Capella and Palmer* (1990) found that gaze, posture, smiling, laughter, and speech rate were affected by perceived attitudinal similarities among young adults.

Research also demonstrates that individuals are attracted to others who are physically similar. Romantic couples showed more physical traits in common than expected by chance (*Alvarez, 2004*). A meta-analysis showed an inter-partner correlation of .39, demonstrating matched physical attractiveness across couples (*Feingold, 1988*). However, both friend and couple similarity are generally greater for behavioral than physical characteristics. *Rushton and Bons* (2005) found friend correlations of .56 for education and .32 for cognitive structure, compared with correlations of .04 for height and .08 for weight. Greater behavioral than physical partner similarities suggests that physical resemblance in the absence of behavioral similarities would not lead to, or sustain, close social relations.

### 1.2.2. Behavioral–genetic

Behavioral–genetic analyses address the genetic and environmental factors underlying behavioral variation. Assortative mating refers to the non-random pairing of individuals in couples matching on selected traits. Assortative mating is relatively high for age and ethnicity (.60) and attitudes and values (.50), but small to modest for physical traits, such as height (.04–.21) and weight (.05–.25) (*Hur, 2003; Rushton & Bons, 2005*; also see *Silventoinen, Kaprio, Lahelma, Viken, & Rose, 2003*). Couples also show varying degrees of positive assortment on wake–sleep cycles (.25) (*Hur, Bouchard, & Lykken, 1998*) and educational level (.67) (*Hur, 2003*).

The consequences of mate resemblance for trait heritabilities are of interest to behavioral–genetic researchers. Much has been written on this topic (*Plomin et al., 2008*), but is beyond the scope of the present study.

### 1.2.3. Evolutionary psychology

Evolutionary psychology is concerned with psychological mechanisms that evolved to meet environmental challenges faced by our ancestors (*Buss, 2012*). *Hamilton* (1964) asserted that altruism should be directed more often toward closely related biological kin than distant kin, as an indirect means by which one's genes are

transmitted to future generations. Thus, he defined *inclusive fitness* as an individual's reproductive success, enhanced by effects on relatives other than offspring, in which each effect is multiplied by the actor's relatedness to the recipient. Proximal events affecting the expression of beneficial interactions between relatives have also been of interest (*Burnstein, 2005*).

*Blaustein* (1983) identified four mechanisms by which kin recognition may occur. They include spatial distribution, familiarity/prior association, phenotypic matching and recognition alleles. Phenotypic matching—the process by which individuals assess correspondence between their own phenotypes and those of others—is the favored hypothesis. These mechanisms were further explored by *Burnstein* (2005), who noted that facial resemblance is highly diagnostic of kinship.

Individuals benefit from cooperative exchanges to the extent that they correctly distinguish kin from non-kin. Possible cues to genetic relatedness between siblings include perinatal association with the biological mother and length of co-residence (*Lieberman, Tooby, & Cosmides, 2007*). However, these characteristics would not apply to U-LAs who are genetically unrelated, or to biological relatives reared apart. Strong social ties have, nevertheless, been documented between biological relatives reunited as adults, including MZ twins (*Segal, Hershberger, & Arad, 2003*), parents and children (*Pacheco & Eme, 1993*) and siblings (*Gladstone & Westhues, 1998*).

A related phenomenon is genetic sexual attraction, namely the powerful sexual connection experienced by some separated biological relatives following reunion (*Gonyo, 1987*). According to *Gonyo* (1987) attraction seems greatest between individuals who perceive similarities between themselves. Researchers working with reunited twins have observed flirtatious behavior between opposite-sex co-twins (*Segal, 2012*), and marriages between such pairs have occurred (*Segal, 2000*). The absence of a shared social environment during children's early years, thereby interfering with the Westermarck Effect and allowing romantic feelings to evolve upon meeting, are most likely involved.

Partner choice may also be modulated by similarity of the major histocompatibility complex (MHC). Women prefer the scents of males whose HLA genes are similar to their own paternally derived genes, rather than exposure to HLA-associated odors from their families during development (*Jacob, McClintock, Zelano, & Ober, 2002*). These factors could affect attraction between reunited relatives and other biological and non-biological partners.

## 1.3. The present study

The present study revisited the issue of personality similarity in U-LA pairs using an alternative personality measure. It was expected that the personality correlations would prove negligible in the replication as in the first analysis. The present study also assessed the degree of self-reported closeness and familiarity experienced by U-LAs, both upon meeting (retrospective) and subsequently (current). Comparative data from MZA and DZA twins provided an informative context for evaluating these responses. U-LAs' reactions to encountering someone with whom they showed striking physical resemblance were also examined.

Close relations between U-LAs were not anticipated given (1) the lack of personality and self-esteem resemblance between U-LAs, and (2) the greater spouse and friend assortment on behavioral versus physical traits. However, both the U-LAs and many MZA twins were brought together because their physical resemblance impressed a third party, and many MZAs were previously unaware of having a twin. Qualitative differences between MZA and U-LA reunions are considered in the discussion.



Fig. 1. Male and female U-LA pairs. Photo credit: François Brunelle.

**Table 1**  
U-LA intraclass correlations and 95% confidence intervals for the Big Five personality factors: constructive replication.

Personality factors	U-LA-1 Segal (2013) n (pairs) = 23	U-LA-2 (replication) n (pairs) = 26
Stability	-.06 (-.45, .35)	-.16 (-.51, .23)
Extraversion	-.07 (-.46, .34)	-.29 (-.60, .10)
Openness	-.27 (-.60, .14)	.14 (-.25, .49)
Agreeableness	-.13 (-.50, .28)	-.03 (-.40, .35)
Conscientiousness <sup>a</sup>	.29 (-.12, .62)	.18 (-.21, .52)
Mean	-.05	-.03

<sup>a</sup>  $p < .08$ .

## 2. Materials and methods

### 2.1. Participant sample

U-LA pairs were identified by the French Canadian (Québécois) photographer, François Brunelle. Brunelle has composed black and white photographs of these pairs for years. Photographs of two U-LA pairs are shown in Fig. 1.

The final sample initially studied by Segal (2013) included 24 males and 24 females organized into 11 same-sex male pairs, 12 same-sex female pairs, and two incomplete male pairs. The mean

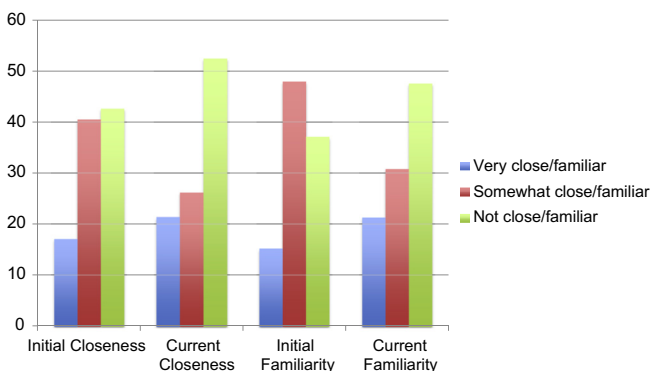


Fig. 2. Closeness and familiarity ratings for U-LAs.

age of the 48 participants was 46.21 (SD = 13.96), ranging between 16 and 84 years. Following their photo session, most pair members did not have personal contact with one another (56.5%) or met only one time per year, on average, or less (17.4%). The PFI Questionnaire de Personnalité au Travail (Personality for Professionals Inventory; Rolland & de Fruyt, 2009) that generates the Big Five personality factors, was used in this study. Additional information about the U-LAs is available in the original paper.

Unbeknownst to the first two authors, the third author had obtained personality data from the same U-LA sample with three additional pairs, using an alternative measure. (The samples were completely overlapping, albeit with the addition of one new pair and the members of two formerly incomplete pairs.) The replication sample included 26 U-LA pairs, 13 male and 13 female, with a mean age of 47.19 years (SD = 13.78), range 16–84. The slightly older age of the second sample reflects their later participation time.

### 2.2. Materials

The personality questionnaire used in the constructive replication was the French version of the 60-item NEO (McCrae & Costa, 2004). This inventory is the short form of the NEO-PI-R and measures the Big Five personality traits of Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism. Participants completed this inventory at home and returned it by mail.

The Social Relationship Inventory was a modified version of the Twin Relationship Survey completed by participants in the Minnesota Study of Twins Reared Apart (MISTRA) (Segal, 2012; Segal et al., 2003). Feelings of social closeness upon meeting were rated on a 1–6 scale (1 = greater than best friends to 6 = less than for most people I meet for the first time). This format was repeated with reference to their immediate feelings of familiarity, and current feelings of closeness and familiarity. Participants also qualitatively described the experience of meeting their look-alike. Information about perceptions of physical and behavioral similarity was also examined.

## 3. Analysis

### 3.1. Personality

Intraclass correlations were calculated for the Big Five personality traits in the constructive replication and compared with those from the original analysis. Given the small sample size, the statistical significance level was initially set at  $p < .10$ . However, the results were comparable at the  $p < .05$  level, so that value was applied throughout. The personality data were age- and sex-corrected using the methods of McGue and Bouchard (1984).

### 3.2. Social relatedness

The response format for the French version of the four structured closeness and familiarity questions was identical to that of the English version. The U-LAs' written answers to unstructured questions were translated from French to English by a French-speaking assistant. Analyses include graphical displays of the frequencies of answers to the four structured closeness and familiarity items. Comparison of these results with those of MZA and DZA twin pairs is provided.

### 3.3. Qualitative analysis

An initial qualitative approach that included coding and analysis was used to evaluate participants' written reactions to meeting

**Table 2a**  
U-LAs' qualitative responses to their perceptions of physical similarity.

Category	Comment
Positive	
Amusement	"I found it amusing to encounter [my double] who I believed at first sight did not look like me that much" "Kindness and funniness"
Surprise	"I laughed while I was watching him" "Surprise and interest: Do I look alike?" "A bit surprised"
Happiness/pleasantness	"Very surprised to find the extent to which he was very kind" "The encounter was very pleasant as if we had known each other" "It made me feel good because I found her very pretty" "I have a very pleasant friend"
Negative	
Disappointment	"I was a bit disappointed: I was waiting for something magical" "It did not feel like a pleasant experiment" "I would like to know if I am losing my confidence (because of her)"
Identity loss	"It was like an infringement of identity" "She took the path I have not taken" "I saw myself in the mirror and I got scared. My identity was shaken"
Intra-pair comparison	
Strangeness	"I found it very strange to look at him and to see me" "I got a strange feeling living a rare moment" "It was like a stealthy glance into the mirror"
Curiosity	"I was curious and amused at the idea of encountering my double" "Why should I live around her if she goes everywhere with my facial traits?" "I was curious to compare our similarities and our differences"
Indifference	"I am indifferent to the idea that someone may be my double" "Nothing special – personally, they often tell me I look like other comedians or colleagues" "I felt indifference as I was watching her"

and knowing their unrelated look-alike (Glaser & Strauss, 1967). The next step applied thematic qualitative analysis to identify emerging themes, via multiple independent readings of each transcript by the first two authors (see Corbin & Strauss, 1990; Jenkins & Coker, 2012). Common responses related to physical and behavioral reactions were recorded and documented during multiple readings of the transcripts.

## 4. Results

### 4.1. Constructive replication

Openness showed a small, but significant positive association with age ( $r = .31, p < .05$ ), such that older individuals scored higher on this trait. The other four personality factors were uncorrelated with age and all five factors were uncorrelated with sex.

The five personality factors showed negligible to small U-LA intraclass correlations, ranging from  $-.29$  to  $.18$ , none being statistically significant. Conscientiousness showed the highest correlation in both the replication ( $r_i = .18$ ) and the original analysis ( $r_i = .29$ ), while the sizes of the other four correlations varied across the two analyses, most likely reflecting small sample fluctuation.

Most importantly, the mean correlation of  $-.03$  was nearly identical to the mean correlation of  $-.05$  reported by Segal (2013), confirming the lack of personality similarity in U-LA pairs. These correlations were also substantially below those reported previously for MZA ( $r_i = .53$ ), MZT twin pairs ( $r_i = .48$ ), DZA ( $r_i = .15$ ) and DZT ( $r_i = .20$ ) twin pairs (Bouchard, 1993). Findings from the two studies are compared in Table 1.

### 4.2. Social relationship inventory

The six possible responses to the closeness and familiarity questions were reduced to three categories and renamed (1) very close/very familiar, (2) somewhat close/somewhat familiar, and (3) not close/not familiar. A minority of U-LAs chose the highest levels of initial and current closeness (17%, 21.4%) and familiarity (15.2%, 21.4%). Over time, the greatest average change in closeness was in shifts from somewhat close to not close, and somewhat familiar to not familiar. These data are displayed graphically in Fig. 2. In contrast, higher proportions of MZA and DZA twins expressed the highest levels of closeness (MZA: 70%, 80%; DZA: 49%, 62%) and familiarity (MZA: 62%, 79%; DZA: 25%, 60%), upon meeting and subsequently. Both MZA and DZA twins showed shifts toward

**Table 2b**  
U-LAs' qualitative responses to their physical and behavioral resemblance.

Physical resemblance	
Some resemblance	"My double is an actor. I saw him in a commercial and thought I was seeing myself" "People could easily think that we are brothers" "I found that she looked a bit like me"
No resemblance	"This person is not my double" "She was slimmer than me, more mature, and more beautiful" "I am still not convinced of our physical resemblance"
Behavioral resemblance	
Some resemblance	"We are alike in our manners" "We have many things in common, such as sports, reading and culture"
No resemblance	"I was not convinced of our physical resemblance" "This person is not my double"

increased social relatedness over time (Segal et al., 2003). Reared apart twins also indicated significantly less closeness and familiarity toward the unrelated siblings they were raised with, relative to the twins they met recently.

#### 4.3. Qualitative analyses

Qualitative analyses included participants' unstructured responses to meeting their look-alike, and responses to perceived similarities. Data were available for approximately half the sample, suggesting that some individuals who did pursue the relationship did not answer.

##### 4.3.1. Immediate and current responses to meeting

Responses were organized into three main categories with several subcategories. The three main categories included Positive responses, Negative responses and Intra-pair Comparison. The Positive category included comments reflecting amusement, surprise and happiness/pleasantness. The Negative category included comments reflecting disappointment and identity loss. The Intra-pair Comparison category included comments reflecting strangeness, curiosity and indifference.

Most participants fell into the Positive (45%) or Comparison categories (39%), with some overlap. Examples of their responses are in Table 2a.

##### 4.3.2. Responses to physical and behavioral resemblance

Participants were not asked directly about their perceptions of physical resemblance, but approximately one-third included relevant information in the context of their social relationships. About 60% of these respondents indicated "some physical resemblance," while the remainder indicated "no physical resemblance." Some physical resemblance reflected participants' perceptions of similarities in height, weight, facial traits and other physical attributes. No physical resemblance indicated failure to recognize physical similarities. Only three individuals recognized behavioral similarities, such as in interests and mannerisms. Examples are provided in Table 2b.

## 5. Discussion

### 5.1. Replication

The replicated analysis yielded a mean personality intraclass correlation ( $r_1 = -.03$ ), nearly identical to the value obtained in the initial analysis ( $r_1 = -.05$ ). This finding is consistent with the view that physical similarity does not forecast behavioral similarity (Rowe, 1994), even in individuals selected for considerable physical similarity. Evaluating this result in the context of twin studies strengthens this finding in that both MZ and DZ twins reared apart and together show greater personality similarity than U-LAs. The DZ twins make a stronger case in this respect, because they look less alike than the U-LAs, yet show greater behavioral resemblance.

The present study also showed that physical resemblance does not lead to or sustain close social relations between people in the absence of perceived behavioral similarities. Higher proportions of reunited MZA and DZA twin pairs from the MISTRA indicated closer social relatedness scores than the U-LAs. Furthermore, shifts in social relatedness among the U-LAs were toward decreased closeness and familiarity, but were in the opposite direction for the twins. Again, the DZ twins may make a stronger case for genetic influence on social attraction (via behavioral resemblance) because they are not physically identical. These findings agree with the friend and spouse correlations reported above showing higher behavioral than

physical assortment. They also contribute to evolutionary considerations in that phenotypic matching, based on physical similarity alone, may not always be a reliable cue to genetic relatedness.

It is reasonable to ask the questions: what role does prior knowledge of twinship play in the first meetings and evolving relationships of reunited twins? Virtually all twins in the MISTRA and previous reared apart studies were aware of their twinship before reunion, even if they had learned about it shortly before meeting. In contrast, all U-LAs were brought together knowing that they were not twins. But what if they had been told they were twins when in fact they were not? Would this have made a difference in how well they got along? Conversely, what if twins or siblings sought each other out and associated with one another without knowing their true biological relationship? Several exceptional cases speak to these issues and allow some reconciliation of the contrasting twin and U-LA findings:

- Twenty-year-old Canadian MZ male twins were introduced to one another by a mutual acquaintance who noted their physical resemblance. The twins were friends for a year, sharing many interests in common, before comparing their life histories that suggested they were twins (Segal, 2007). One twin had been switched with a non-twin infant when the three babies were in temporary foster care.
- Five-year-old MZA British female twins lived nearby and sought each other out as playmates despite the lack of family contact (Shields, 1962). The twins were attracted to one another at age two, but meetings had been discouraged.
- Reared-apart female half-siblings and co-workers became close friends prior to discovering their true relatedness (Jerome, Alexander, & Young, 1994).
- Strong social attraction and some marriages have been documented between DZA male–female twins unaware of their biological relatedness (Segal, 2008).
- Several unrelated individuals have been raised as DZ twins, following the switching of one MZ co-twin due to hospital oversight. These pair members generally did not develop the same close social relations with their alleged twin as they did with their true twin, and few could name behavioral similarities between themselves (Segal, 2011). However, close feelings were mutually expressed by some pair members.
- Separately adopted Chinese girls were thought to be MZ twins by their respective families, based on their physical resemblance. DNA tests revealed a lack of genetic relatedness, indicating that physical similarity does not always reliably index biological relatedness.

The representativeness of the foregoing observations is unknown, given the relative rarity of separated twins, but they are suggestive. The common thread underlying these life histories is the perceived behavioral commonality between the biological relatives that does not characterize the non-biological pairs.

## 6. Caveats and conclusions

Some limitations of the present study are recognized. The sample sizes were small and the replication was done using virtually the same individuals. Access to a larger sample, and a different U-LA pool would increase confidence in the findings. Efforts are underway to gather data from newly discovered pairs. In addition, social relatedness ratings were not obtained for U-LAs' own biological relatives. These ratings would have allowed informative comparisons with their ratings for their look-alike, given that in most cases they looked more like their look-alike U-LA than their biological family members. Finally, U-LAs were brought together because

others recognized their similarities. Comparing personality similarity and social attraction in U-LAs who did and did not perceive that they were physically similar would help identify contributions to these measures.

Despite the foregoing concerns, the present findings are encouraging and identify U-LA pairs as a valuable participant group for exploring links between physical similarity and social attraction. The current findings argue against meaningful associations between physical and behavioral resemblance, and increased physical resemblance and social closeness.

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