Rose-Colored Glasses in Initial Romantic Encounters? Examining Positive Partner
Illusions and Their Interpersonal Consequences in the Very Early Stages of Romantic
Acquaintance

Stefanie N. Wurst, Sarah Humberg, Mitja D. Back

University of Münster, Germany

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Author Note

We embrace the values of openness and transparency in science (Schönbrodt, Maier, Heene, & Zehetleitner, 2015). We therefore follow the 21 word solution (Simmons, Nelson, & Simonsohn, 2012) or refer to our project documentation (see <http://osf.io/nwvr3/>). We have furthermore published scripts for all data analyses reported in this manuscript and provide access to the data necessary to reproduce the reported results (see <http://osf.io/bd8xg/>). The hypotheses and analyses of the present paper have been preregistered (see <http://osf.io/ykxe8/>).

Abstract

We investigated whether positive partner illusions (i.e., perceiving a romantic partner more positively than she/he actually is) and their beneficial interpersonal consequences already occur in initial romantic encounters. In a real-life speed-dating context, 398 heterosexual singles (aged: 18-28) indicated their perceptions of their dating partners directly after each speed-date. We obtained 2 kinds of reality benchmarks to compare these partner perceptions against: dating partners' self-perceptions and consensus ratings about the dating partners. With 3 follow-ups in the 6 weeks following the speed-dating, we assessed interpersonal consequences between daters. Response surface analyses revealed no evidence of positive illusions or of beneficial interpersonal consequences of positive illusions in initial romantic encounters. These findings (a) suggest that positive illusions start to emerge at later stages of romantic acquaintance and (b) inform research on the psychological processes underlying positive illusions. We furthermore provide methodological recommendations for future longitudinal research investigating the time of onset of positive illusions and the formation of romantic relationships in general.

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A common proverb states that lovers wear rose-colored glasses (see also Hendrick & Hendrick, 1988). Thus, many people believe that individuals in romantic relationships see their romantic partner in the best possible light while overlooking, downplaying, or ignoring their partner's faults and negative attributes. A broad range of research in the field of romantic relationships indicates that people in romantic relationships indeed have *positive illusions* about their romantic partner—that is, they perceive their romantic partner more positively than she/he really is (for a review, see Fletcher & Kerr, 2010).¹ And these positive illusions about a partner were found to have positive consequences for relationship quality both concurrently and in the long run, such as a higher relationship satisfaction of both partners and a greater longevity of the relationship (e.g., Le, Dove, Agnew, Korn, & Mutso, 2010; Murray, Holmes, & Griffin, 1996b; Schaffhuser, Allemand, Werner, & Martin, 2016; for a review, see Fletcher & Kerr, 2010). What is not known about the nature of positive illusions so far, however, is where these positive illusions originate. Are positive illusions already present in the very early stages of mate selection? That is, do people already perceive potential partners they feel attracted to more positively than these partners actually are? And do such early positive illusions also have positive consequences on subsequent dating encounters? The present paper aims to fill this gap by examining positive illusions and their consequences in first and subsequent romantic encounters.

Positive Illusions in Established Romantic Relationships

Although positive illusions in the early stages of mate selection have not yet been investigated, a large amount of literature has documented the existence of such overly positive partner perceptions in established romantic relationships (for overviews, see Fletcher & Kerr, 2010; Gagné & Lydon, 2004; Niehuis, Lee, Reifman, Swenson, & Hunsaker, 2011). This line of research usually asks people currently involved in a romantic relationship to rate their romantic partner on a number of personality traits and attributes and then compares

these *partner perceptions* to a *reality benchmark* of the romantic partner's actual personality traits and attributes in order to gauge whether the partner perceptions indeed positively exceed reality (e.g., Fletcher & Kerr, 2010; Niehuis et al., 2011). The most commonly used reality benchmarks are the romantic partner's self-perception on the respective traits and attributes or informant ratings of the romantic partner's traits and attributes, for example provided by a friend of the partner or as a consensus rating by multiple informants (e.g., Barelds, Dijkstra, Koudenburg, & Swami, 2011; Fletcher & Kerr, 2010; Gagné & Lydon, 2004; Murray, Holmes, Dolderman, & Griffin, 2000; Niehuis et al., 2011; Pollis, 1969). The partner's self-perception is regarded as the more conservative reality benchmark because self-perceptions are in themselves already positively biased (e.g., Fletcher & Kerr, 2010; Gagné & Lydon, 2004; Niehuis et al., 2011; Taylor & Brown, 1988, 1994). Thus, for a partner perception to exceed the partner's self-perception, the partner perception has to be even more positively biased. The high conservativeness of this benchmark has made the partner's self-perception the most commonly used reality benchmark (Fletcher & Kerr, 2010).

Using these kinds of reality benchmarks, a large number of studies have shown that romantic relationship partners indeed perceive each other's personality traits and attributes in a more positive light than is warranted by reality—the average effect size of this effect being .15 (Fletcher & Kerr, 2010; see also, e.g., Barelds-Dijkstra & Barelds, 2008; Boyes & Fletcher, 2007; Murray, Holmes, & Griffin, 1996a, 1996b; Solomon & Vazire, 2014; Swami, Waters, & Furnham, 2010; Watson & Humrichouse, 2006). This positive illusions effect in established romantic relationships is remarkably stable: It has been found in dating couples as well as in married couples (e.g., Murray & Holmes, 1997; Murray et al., 1996a), in heterosexual as well as in homosexual romantic relationships (e.g., Conley, Roesch, Peplau, & Gold, 2009), and regardless of the reality benchmark used (e.g., Barelds et al., 2011; Murray & Holmes, 1997; Murray et al., 2000). These positive illusions have been proposed to

be a result of the fact that people do not know everything about their romantic partner and fill in the blanks with their image of an ideal partner (e.g., Murray et al., 1996a, 1996b; Niehuis et al., 2011). And even if people know about their partner's faults, they downplay the importance of these faults, change the meaning of the faults, or ignore the faults altogether to maintain their overly positive image of their romantic partner (e.g., Murray, 1999; Murray & Holmes, 1999). But why do romantically involved people go to such lengths to idealize their romantic partner? It is presumed that positive illusions are adaptive and functional in established romantic relationships: Positive illusions are thought to foster the feeling that the current romantic partner is the "right" partner, thus reducing doubts about the relationship and attention to potential alternative partners, and in turn increasing one's commitment and the effort put into maintaining the romantic relationship (e.g., Fletcher & Kerr, 2010; Murray, 1999; Murray et al., 1996a; Murray, Holmes, & Griffin, 2003; Schaffhuser et al., 2016).

Consequences of Positive Illusions in Established Romantic Relationships

As the abovementioned functionality of positive illusions suggests, positive illusions about a partner's attributes have been found to have positive consequences in established relationships—both concurrently and in the long run. Prior cross-sectional research has shown that positive illusions by one partner are associated with higher relationship satisfaction for both partners (e.g., Barelds & Dijkstra, 2009; Boyes & Fletcher, 2007; Luo & Snider, 2009; Schaffhuser et al., 2016) as well as with higher relationship quality for both partners, including a higher level of intimacy, closeness, and love, as well as fewer doubts about the relationship, fewer conflicts, and higher relationship stability (Campbell, Lackenbauer, & Muise, 2006; Kwang & Swann, 2010; Miller, Niehuis, & Huston, 2006; Murray et al., 1996a, 1996b). Longitudinal studies have furthermore revealed that most of these effects persisted over time (Le et al., 2010; Miller et al., 2006; Murray & Holmes, 1997; Murray et al., 1996b). Longitudinal studies have even revealed self-fulfilling effects of

positive illusions: Across time, the positively perceived romantic partner started to incorporate this positive image into his/her self-concept and adopted a more positive self-view (Murray et al., 1996b, 2003). Overall, a meta-analysis by Fletcher and Kerr (2010) found an average association between positive illusions and positive relationship outcomes of $r = .36$ (i.e., medium-sized). These positive consequences of positive illusions in romantic relationships are thought to occur due to behavioral processes: Highly positive perceptions and positive thoughts about a partner are presumed to also be reflected in the behavior towards the partner. For example, one might be more attentive, admiring, understanding, and forgiving towards the partner and treat her/him as someone unique and special, which in turn is supposed to lead to the abovementioned positive consequences for both partners in a romantic relationship (e.g., Boyes & Fletcher, 2007; Murray et al., 1996a; Niehuis et al., 2011; Schaffhuser et al., 2016).

Past research on the consequences of positive illusions has focused almost entirely on investigating linear associations between overly positive partner perceptions and positive relationship outcomes (see also Tomlinson, Aron, Carmichael, Reis, & Holmes, 2014). However, many researchers have voiced the supposition that too highly unrealistic idealizations of a romantic partner might no longer be as beneficial because they might lead to later disappointment if they deviate too far from reality (Fletcher & Kerr, 2010; Murray, 1999; Murray et al., 1996a, 1996b; Neff & Karney, 2005; Niehuis et al., 2011; Swann, De La Ronde, & Hixon, 1994). According to this supposition, the relation between positive illusions and beneficial relationship outcomes may rather be inverted u-shaped with an optimal amount of positive illusions that leads to the most positive relationship outcomes. Above this optimal amount, when positive illusions move too far from reality, the positive consequences for relationship outcomes might decrease again. The few studies that have investigated the possibility of such a curvilinear relation have found initial support for the supposition (De La

Ronde & Swann, 1998; Tomlinson et al., 2014; see also Morling & Epstein, 1997; Swann, Hixon, & De La Ronde, 1992). We therefore suggest that the relation between positive illusions and beneficial relationship outcomes is inverted u-shaped.

Positive Illusions in First and Subsequent Romantic Encounters

To our knowledge, the present paper is the first to examine positive illusions and their beneficial consequences in the early stage of mate selection. Such research is crucial for gaining a full understanding of the nature of positive illusions as it allows insight into the point of onset of positive illusions: Are positive illusions a characteristic of romantic acquaintance from the very early stages on? Or do positive illusions start to develop only in later, more advanced stages of a romantic relationship? Several researchers have therefore called for investigations of the existence of positive illusions and their consequences in the context of mate selection and initial romantic encounters (Fletcher & Kerr, 2010; Niehuis et al., 2011), and the present paper aims to fill this gap.

Prior research on initial romantic attraction has yielded evidence that there is at least a positive main effect of positive perceptions in first romantic encounters: The more a person feels attracted to a potential partner, the more positively this person perceives the potential partner's traits and attributes (e.g., Eastwick & Finkel, 2008; Fisman, Iyengar, Kamenica, & Simonson, 2006; Fletcher, Kerr, Li, & Valentine, 2014; Wurst & Back, in press). But is there also an effect of positive illusions, that is, are appealing potential partners perceived more positively than they actually are? Both lay theories and theoretical scientific considerations presume that this might be the case. Literature on infatuation and the very early stages of romantic love describes an overly positive perception of the adored person as a central characteristic of early infatuation (e.g., Fisher, Aron, & Brown, 2006; Fletcher & Kerr, 2010; Goodwin, Fiske, Rosen, & Rosenthal, 2002; Hatfield & Sprecher, 1986; Reis & Aron, 2008). In addition, we hold that one central cause that is proposed to underlie positive illusions in

established romantic relationships should be especially pronounced in first romantic encounters as well: filling in knowledge gaps about the other with the image of an ideal partner. Although people are able to deduce a reasonable amount of information about a previously unacquainted person in a very small amount of time (e.g., Back & Nestler, 2016; Borkenau, Mauer, Riemann, Spinath, & Angleitner, 2004; Carney, Colvin, & Hall, 2007), an initial romantic encounter leaves a lot of parameters unknown about a potential partner, and these unknown parameters might then be filled in by the image of an ideal partner. Thus, probably even more than in established romantic relationships, filling in the blanks with an ideal image is likely to lead to positive illusions about appealing potential partners in initial romantic encounters. Furthermore, positive illusions might already be functional and adaptive in first romantic encounters. If an appealing potential partner is perceived to be a “good”, “excellent”, or even “the right” partner from early on, this might contribute to motivating a person to put effort into courting and winning the potential partner over and to maintaining this motivation throughout the high level of uncertainty that characterizes the courtship period (e.g., Eastwick & Finkel, 2008; Huston, Houts, Caughlin, Smith, & George, 2001; Tennov, 1999).

Taken together, these considerations suggest that positive illusions might already be present in first romantic encounters. We therefore hypothesize that in initial romantic encounters, people perceive appealing potential partners in a more positive way than these potential partners actually are. More precisely—as romantic appeal is a dimensional rather than a categorical construct—we expect that the more appealing a potential partner (i.e., the *target*) is to a given person (i.e., the *rater*), the higher the rater’s positive over-perception of the respective potential partner’s characteristics and attributes should be.

If positive illusions about potential partners already arise in first romantic encounters, it is reasonable to presume that these illusions lead to positive relational consequences in

subsequent romantic encounters—just as positive illusions in established romantic relationships do. Several considerations support this supposition. First, findings from non-romantic context studies have shown that positive first impressions have long-lasting positive interpersonal effects such as a persistent liking of the other person and a persistent interest in having contact with the other person (Human, Sandstrom, Biesanz, & Dunn, 2013). It is most likely that such long-lasting beneficial effects also occur for positive initial impressions in romantic contexts. One might therefore suppose that long-lasting beneficial interpersonal consequences do also emerge for initial positive illusions about potential partners. What is more, the mechanisms that are presumed to lead to the beneficial consequences of positive illusions in established romantic relationships might already be operating in first romantic encounters as well: If one perceives a potential partner in an overly positive light, this is likely to also be reflected in positive behaviors toward the potential partner, which in turn should foster positive interpersonal outcomes such as mutual attraction, trust, closeness, or the wish for more frequent contact.

Following this reasoning, we expect positive interpersonal consequences of initial positive illusions in subsequent romantic encounters. As pointed out for the consequences of positive illusions in established romantic relationships, we expect this relation to be curvilinear such that there is an optimal amount of positive illusions about a potential partner, which leads to the most beneficial interpersonal outcomes in subsequent encounters, whereas too positive illusions might lead to disappointment and thus yield less beneficial subsequent interpersonal outcomes. Thus, we hypothesize an inverted u-shaped relation between initial positive illusions and subsequent beneficial interpersonal outcomes such as contact frequency, romantic attraction, and relationship quality.

Methodological Considerations

Most prior research on positive illusions and their consequences has operationalized positive illusions as difference score between partner perception and reality benchmark (e.g., Barelds & Dijkstra, 2009; Gordon, Johnson, Heimberg, Montesi, & Fauber, 2013; Pollis, 1969; Schaffhuser et al., 2016) or by using regression residuals of partner perception with the reality benchmark partialled out (e.g., Barelds & Dijkstra, 2011; Boyes & Fletcher, 2007; Murray & Holmes, 1997; Murray et al., 1996a, 1996b; see also Fletcher & Kerr, 2010; Niehuis et al., 2011). As several authors have pointed out, however, using these methods to examine research questions concerning the effect of a discrepancy between two variables (i.e., between partner perception and reality benchmark in the case of positive illusions) on a third variable is problematic for several reasons (e.g., Asendorpf & Ostendorf, 1998; Edwards, 1994, 2001; Edwards & Parry, 1993; Griffin, Murray, & Gonzalez, 1999; Zuckerman & Knee, 1996). We will not list all reasons here but will illustrate the main point. When operationalizing positive illusions as difference score, this inevitably confounds the effect of the actual discrepancy with the effects of its constituent parts (i.e., with the main effect of partner perception and the main effect of the reality benchmark). Thus, an effect of positive illusions operationalized as difference score on an outcome can occur due to an effect of the discrepancy, due to a main effect of partner perception, or due to a main effect of the reality benchmark, without any possibility of disentangling these effects and of identifying the “true” cause of the effect (see also Murray et al., 2000). Equivalent problems ensue when regression residuals are used (as they are also computed as difference scores), which renders them suboptimal for investigating discrepancy effects as well (Humberg et al., in press).

A method for examining discrepancy effects without the problems associated with difference scores and regression residuals is Response Surface Analysis (RSA; e.g., Cohen,

Nahum-Shani, & Doyeh, 2010; Edwards, 2002, 2007; Nestler, Grimm, & Schönbrodt, 2015; Schönbrodt, 2016b). In RSA, the effect of two predictor variables (i.e., partner perception and reality benchmark in the case of positive illusions) and the effect of the interplay between these variables on an outcome measure are modeled by a polynomial regression of the form:

$$\begin{aligned} \text{Outcome} = & b_0 + b_1 * \text{Predictor1} + b_2 * \text{Predictor2} + b_3 * (\text{Predictor1})^2 + \\ & b_4 * \text{Predictor1} * \text{Predictor2} + b_5 * (\text{Predictor2})^2 + \text{Error} \end{aligned} \quad (1)$$

Thus, RSA models the main effects of the predictors, their interaction effect, and the quadratic effects of each predictor on an outcome. The result of this regression is then plotted as a three-dimensional surface, which can be interpreted easily.

Most important, RSA allows researchers to examine and unequivocally interpret effects of the discrepancy between the two predictors and thus allows us to test the two hypotheses proposed in the present paper. To illustrate this point, first recall our hypothesis about the existence of positive illusions in first romantic encounters. We expect a linear association between feeling attracted to a potential partner and having positive illusions about this potential partner. Such an effect would create a response surface as presented in Figure 1a. For an easy understanding of this figure, please for now ignore the plotted surface and focus on the floor of the cube. The grey triangle on the floor of the cube in Figure 1a represents the area of positive illusions where partner perceptions (represented on the x-axis as Predictor 1) are more positive than the reality benchmark (represented on the y-axis as Predictor 2). The line labeled *a* represents the *line of congruence* (Schönbrodt, 2016b), where partner perceptions exactly match the reality benchmark. All lines parallel to the line of congruence within the grey “positive illusions” area (such as the line labeled *b*) indicate certain degrees of positive illusions, and the farther away the parallel line is from the line of congruence, the

higher is the degree of positive illusions. At Point Q, for example, the discrepancy between partner perception and reality benchmark (i.e., the positive illusion) is twice as large as it is at Point P. The area left of the line of congruence, by contrast, represents an underestimation of potential partners because, in this area, the partner perceptions are less positive than the reality benchmark.

Now, if there is the proposed linear association between feeling attracted to a potential partner and having positive illusions about this potential partner, this means that with increasing positive illusions, romantic attraction (depicted on the z-axis in Figure 1a) will also continuously increase. And this is exactly what is represented by the surface in Figure 1a: The surface represents the values of romantic attraction at all possible combinations of predictor values. As positive illusions increase (i.e., when moving from left to right along the line labeled *c* in Figure 1a), the surface also continuously rises. Thus, Figure 1a is the RSA representation of our first hypothesis.

Now recall our second hypothesis about the consequences of positive illusions. We expect an inverted u-shaped curvilinear relation between positive illusions about a potential partner and subsequent beneficial interpersonal outcomes. This means that at a certain degree of positive illusions, the highest positive consequences should ensue, whereas at higher and lower levels of positive illusions, less positive consequences should ensue. Such an effect would create a response surface as presented in Figure 1b. The surface in Figure 1b again represents the values of the outcome variable (i.e., positive interpersonal consequences in the present case) at all possible combinations of partner perception and reality benchmark. The surface and thus the positive interpersonal consequences reach their maximum above the line labeled *b* (i.e., at a certain degree of positive illusions) and drop at higher and lower levels of positive illusions. Figure 1b is thus the RSA representation of our second hypothesis.

For both RSA representations of our hypotheses, we can test whether they fit actual data (Schönbrodt, 2016b), which allows us to statistically test our hypotheses (as will be described in the Analyses section). Furthermore, as illustrated by the response surface implementations of our hypotheses, RSA allows us to examine both linear and curvilinear (i.e., quadratic) effects of the discrepancy between two variables. It does so without computing a single discrepancy score from these two variables (as the two predictors are entered into the regression separately), and thus avoids the inherent confounds associated with using difference scores or regression residuals (e.g., Edwards, 2002). We therefore chose the RSA methodology to test our hypotheses.

The Present Research

The aim of the present article was to examine whether positive illusions are already present in the perception of potential romantic partners in first romantic encounters and whether such initial positive illusions about a potential partner show beneficial interpersonal consequences in subsequent romantic encounters with the potential partner.² To investigate these questions, we used data from the “Date me for Science Study”, a large speed-dating study with several follow-up assessments (Wurst & Back, 2016, see <http://osf.io/nwvr3/>). In this study, heterosexual participants had brief first dates with opposite-sex participants in a dating laboratory and indicated their perception of each dating partner on a number of characteristics directly after each date. As is common for speed-dating events, participants who mutually agreed were given each other’s contact information and thus could contact each other again after the speed-dating event. We conducted several follow-up assessments during the six weeks after the speed-dating event to ask participants about their interpersonal outcomes in all subsequent romantic encounters that took place between participants after the speed-dating event.

We assessed two kinds of reality benchmarks to compare participants' perceptions of their dating partners against: (a) the dating partners' self-perception, as this is the most commonly used and the most conservative reality benchmark in research on positive illusions (e.g., Fletcher & Kerr, 2010), and (b) the consensus rating about the dating partner by all participants who had a date with the respective dating partner, as consensus ratings are a good means for approximating reality without the biases of self-ratings (e.g., Funder, 2012; Funder & West, 1993; Kenny, Albright, Malloy, & Kashy, 1994; Vazire, 2006).

For both reality benchmarks, we posed the following hypotheses about positive illusions (PI) as deduced above and as depicted in Figure 1:

PI-Existence Hypothesis: We expected positive illusions to already occur in first romantic encounters. That is, the more participants felt attracted to a dating partner in a speed-date, the more strongly they should overestimate the dating partner's positive characteristics (i.e., the higher should be the discrepancy between their perceptions of their dating partner and the reality benchmark).

PI-Consequences Hypothesis: We expected initial positive illusions about a dating partner at the speed-dating event to have an inverted u-shaped relation to positive interpersonal consequences in subsequent romantic encounters with the respective dating partner. Thus, there should be an optimal degree of initial positive illusions which should result in the highest beneficial interpersonal outcomes in subsequent encounters (such as high relationship quality, high interpersonal attraction, and high contact frequency in the weeks after the speed-dating event). At higher or lower degrees of initial positive illusions about a dating partner, subsequent interpersonal outcomes should be less positive.

Hypotheses and analyses of the present paper have been preregistered after data collection had been complete but before data concerning the present research questions had been looked at. The preregistration can be found at

http://osf.io/ykxe8/?view_only=3d355db8484f46ab8a322fec3e9b7513 . Data and analysis code from the present paper can be accessed at

http://osf.io/bd8xg/?view_only=4730ba3473e24f7fbd88bede2aafd0fa . Please also note that this paper comes with online supplemental materials, which can also be accessed at

http://osf.io/bd8xg/?view_only=4730ba3473e24f7fbd88bede2aafd0fa .

Method

Here, we report all measures of the “Date me for Science Study” that are relevant for the present research, all manipulations, all data exclusions (if any), and how we determined our sample size (Simmons et al., 2012). Please see the study’s codebook at <http://osf.io/nwvr3/> for a list of all measures obtained in the study and for further details on the procedure.

Participants

Participants in the “Date me for Science Study” were 400 heterosexual singles who were currently looking for a romantic partner. This sample size represents the number of participants we were able to obtain within the given time frame for data collection (April 2015 – December 2015). Two participants objected to the use of their data afterwards, so the total number of participants for the present research came to 398 (200 females; age: 18-28 years, $M = 22.88$, $SD = 2.63$). In order to take part in the study, participants had to be between 18 and 28 years old, to have (at least) a university entrance diploma (or to currently be about to acquire one), and to self-classify as being predominantly heterosexual. Most participants (91%) were students whom we recruited from a wide range of different majors to minimize the possibility of prior acquaintance. Participants were recruited via university mailing lists, online social networks, lectures, bulletin-board flyers, and advertisements in a local brochure and on a local radio station in Münster, Germany. Participants did not receive

any compensation for their participation in the speed-dating event except for the opportunity to meet a romantic partner.

Procedure

Before taking part in the speed-dating event, all participants filled out a pre-event online questionnaire, which assessed participants' self-ratings on a number of characteristics. Participants were then invited to one of 42 speed-dating events in our dating laboratory. To each event, we invited five female and five male participants (the actual number of participants per event ranged from seven to ten, mean = 9.52, with 35.71% of the events having fewer than 10 participants). Male and female participants were welcomed at opposite-side entrances of the building, were instructed separately, and were afterwards led to separate cubicles where they waited for their speed-dates to begin. Our procedure then differed from the typical speed-dating procedure in that only one date took place at a time to create an exclusive dyadic atmosphere. That is, at each given time point, only two participants were involved in a speed-date, while all other participants remained in their cubicles. The two participants whose turn it was to have their speed-date were fetched from their cubicles and led to a separate dating room. Again, male and female participant were fetched separately (women first). Thus, during the entire speed-dating event (except for the actual speed-dates), male and female participants were separated from each other. Each participant saw and heard each opposite-sex participant for the first time at the moment when their respective date started. Each speed-date lasted three minutes and was videotaped. During the speed-date, the two daters were left alone in the dating room where they were seated at a 90° angle on a couch. Participants were free to choose what to say or to do during their speed-dates. After each speed-date, both participants were led back into their cubicles where they filled out a *post-date questionnaire* that assessed their attraction to their recent speed-dating partner as well as their perception of their dating partner on a number of characteristics. As soon as both

participants had returned to their cubicles, the next two participants were fetched for their date. This procedure was repeated until every participant had dated every opposite-sex participant present. Please note that the time it took participants to fill out the post-date questionnaire was designed to roughly match the time until the participant's next speed-date started. Thus, there was almost no actual "waiting" time for participants in between dates. The entire speed-dating event lasted about three hours. All events took place in the evening, starting at 6 pm.

In each post-date questionnaire, participants also indicated whether they wished to exchange contact information with the respective dating partner ("Yes" vs. "No"). Dating dyads who "yessed" mutually, formed a *match*. Three days after each speed-dating event, we sent participants an e-mail with the name(s) and contact information of their matching partner(s). Participants with at least one matching partner were followed up with three online questionnaires 10, 20, and 40 days, respectively, after they had received the e-mail with their match information. Each follow-up assessed interpersonal outcomes between the matching participants in the weeks following the speed-dating event.

Measures

The following measures of the "Date me for Science Study" were used for the present analyses. Please see the study's codebook at <http://osf.io/nwvr3/> for a list of all measures obtained in the study.

Partner perception. In the post-date questionnaire directly after each date at the speed-dating event, participants rated their recent speed-dating partner on the following 27 characteristics: "good-looking", "sexy/sensual", "attractive voice", "appealing clothes and hairstyle", "well-groomed appearance", "has a healthy lifestyle (e.g., does not smoke or drink (much), exercises)", "smells good", "appealing movements and body posture", "entertaining/humorous", "relaxed/easy when interacting with others", "adventurous",

“tolerant”, “cordial/empathic/supportive/considerate”, “able to take criticism”, “honest/is not concealing anything”, “good househusband/good housewife (e.g., good cook)”, “wants children someday/gets along well with children”, “invests a lot in a romantic relationship (e.g., time/little tokens/presents)”, “romantic”, “mostly in a good mood/optimistic”, “rarely anxious/nervous/worried”, “emotionally mature”, “successful in his/her education/job; his/her job/field of study seems to be prestigious”, “financially secure (parents have high income/property)”, “self-confident”, “assertive”, and “ambitious/goal-oriented”. Each item was rated on a 7-point scale (1= *not at all* to 7 = *very much*).³ We aggregated across all items to create a single score of positivity of partner perception ($\alpha = .93$). In the following, we will refer to this score as the *partner perception*. There was one partner perception score for each rater-target combination.

Reality benchmarks. We assessed the following two kinds of reality benchmarks.

Self-perception. In the pre-event online questionnaire, participants rated themselves on the same 27 characteristics they later rated their dating partners on. Self-ratings were assessed with exactly the same rating scale as the partner ratings after each speed-date (7-point scale ranging from 1= *not at all* to 7 = *very much*). As for the partner perceptions, we aggregated across all self-rating items to create a single score of positivity of self-perception ($\alpha = .82$). In the following, we will refer to this score as *self-perception*. There was one self-perception score for each target.

Consensus rating. Each participant was rated by all his/her dating partners at the speed-dating event. Thus, several partner perception scores resulted for each participant (one score from each of the participant’s dating partners). For each participant, we aggregated across the partner perception scores from all of the participant’s dating partners (mean $ICC(2, k) = .56$) and thus obtained a *consensus rating* of the positivity of each participant. Thus, there was one consensus rating score for each target.

Dependent measures for testing the PI-Existence Hypothesis. To test whether romantic attraction was associated with a positive over-perception of a potential partner's characteristics, we assessed three different operationalizations of romantic attraction directly after each speed-date: *romantic appeal* ("I think this person is romantically appealing"), *short-term appeal* ("To me, this person might be a partner for a one-night stand or a sexual affair"), *long-term appeal* ("To me, this person might be a partner for a long-term committed romantic relationship"). All three items were answered on a 7-point scale (1 = *do not agree at all* to 7 = *agree completely*). As the three items represent different theoretical constructs (i.e., romantic interest in general, short-term romantic interest, long-term romantic interest, respectively), we chose not to aggregate them. Rather, we computed separate analyses for each of the three outcome measures. We did, however, not expect different results for the three operationalizations of romantic attraction.

Dependent measures for testing the PI-Consequences Hypothesis. To test the impact of initial positive illusions from a first romantic encounter on interpersonal outcomes in subsequent romantic encounters, we assessed three different important interpersonal outcomes in the follow-ups: a measure of *romantic attraction* which can be compared to the first encounter analyses, a measure of *contact frequency* between the daters, and a subjective evaluation of the *relationship quality* between the daters. Again, we computed separate analyses for each of the three outcome measures, and again, we did not expect different results for these three operationalizations of romantic interpersonal outcomes.

Romantic attraction. At each follow-up, participants indicated their current romantic attraction to each of their matching partners ("I think [name] is romantically appealing") on a 7-point-scale ranging from 1 = *do not agree at all* to 7 = *agree completely*. For each rater-and-matching-partner combination, we computed a single measure of post-speed-dating-event *romantic attraction* by averaging across the three follow-ups ($\alpha = .86$).

Contact frequency. At each follow-up, participants indicated how frequently they had engaged in different forms of contact (written contact, phone contact, personal contact) with each of their matching partners since the last assessment. All items were answered on an 8-point scale (Follow-Ups 1 and 2: 1 = *never*, 2 = *only once*, 3 = *only on one day, but several times on that day*, 4 = *on 2 days*, 5 = *on 3-5 days (i.e., about every 2nd or 3rd day)*, 6 = *on 6-8 days*, 7 = *about every day*, 8 = *several times every day*; Follow-Up 3:⁴ 1 = *never*, 2 = *only once*, 3 = *only on one day, but several times on that day*, 4 = *on 2-3 days*, 5 = *on 4-10 days (i.e., about every 2nd or 3rd day)*, 6 = *on 11-18 days*, 7 = *about every day*, 8 = *several times every day*). We computed a single score of post-speed-date *contact frequency* for each rater-and-matching-partner combination. We did so by first averaging across the three contact items within each follow-up,⁵ and then we averaged these scores across all follow-ups ($\alpha = .90$).

Relationship quality. At each follow-up, we assessed the quality of participants' current relationship with each of their matching partners with whom they had engaged in contact at least once after the speed-dating event. Relationship quality was assessed with the following five items: "How much do you trust [name]?", "How close is [name] to you?", "How familiar are you and [name]?", "I invest a lot (e.g., time/little tokens/gifts) in my contact with [name]", "I feel comfortable opening up to [name] and disclosing personal information". All items were answered on 7-point scales (trust: 1 = *not at all* to 7 = *completely*; closeness: 1 = *not at all close* to 7 = *extremely close*; familiarity: 1 = *not at all familiar* to 7 = *extremely familiar*; investment and self-disclosure: 1 = *do not agree at all* to 7 = *agree completely*). Again, we computed a single score of post-speed-date *relationship quality* for each rater-and-matching-partner combination. We did so by first averaging across the five items within each follow-up (Follow-Up 1: $\alpha = .90$; Follow-Up 2: $\alpha = .94$; Follow-Up 3: $\alpha = .93$), and then we averaged these scores across the follow-ups ($\alpha = .89$).

Analyses

We used RSAs to test our hypotheses and applied a classic model-testing approach. The RSA surfaces representing our hypotheses depicted in Figures 1a and 1b each represent a specific kind of RSA model. Each of these two models can be tested for whether it fits actual data—as will be described below (see also Schönbrodt, 2016b)—and thus allows us to conduct a statistical test of our hypotheses.

Mathematical details of the two models to be tested. Usually, all parameters b_1 to b_5 in Equation 1 are estimated freely in an RSA (e.g., Edwards, 2007). The resulting response surface of this *full model* can take a variety of possible shapes (e.g., Schönbrodt, 2016b). If one wants to test whether a specific shape of the response surface fits the data—as we wanted to do in the present paper—one first has to define the specific model that one wants to test. This is done by imposing specific constraints on parameters b_1 to b_5 in Equation 1 that then make the surface take on the hypothesized shape (see also Schönbrodt, 2016b). This specific model can then be tested for whether it fits actual data.

For the response surface to take on a shape as depicted in Figure 1a and as expected in the PI-Existence Hypothesis, the following constraints have to be imposed on the parameters in Equation 1: $b_1 > 0$, $b_2 < 0$, $b_3 = 0$, $b_4 = 0$, $b_5 = 0$ (see Humberg et al., in press, for more details on this model and the mathematical derivation of these constraints). Put into words, these constraints mean the following. As we want to model a linear effect (i.e., the higher the romantic attraction, the higher the positive illusions), we constrain the quadratic effects (i.e., b_3 and b_5) and the interaction term (i.e., b_4) in the RSA regression equation to be zero. In addition, the constraints on b_1 and b_2 imply that the slope of the response surface above the so-called line of incongruence (i.e., when moving from the left corner of the cube to the right corner of the cube above the line labeled “c” in Figure 1a) is steeper than the slope of the response surface above the line of congruence (i.e., when moving from the front corner of the

cube to the back corner of the cube above the line labeled “a” in Figure 1a). This is the necessary and sufficient condition for a linear effect of positive illusions (see Humberg et al., in press). In the following, we will call this model the *PI-Existence-Model*.

For the response surface to take on a shape as depicted in Figure 1b and as expected in the PI-Consequences Hypothesis, the following constraints have to be imposed on the parameters in Equation 1: (1) $b_3+b_4+b_5 = 0$, (2) $b_3-b_4+b_5 < 0$, (3) $(b_2-b_1)/4b_3 < 0$, (4) $b_3 = b_5$. The term $b_3+b_4+b_5$ from the first constraint is a common parameter in RSA named “ a_2 ”, which describes the form of the surface’s curvature above the line of congruence (e.g., Cohen et al., 2010; Shanock, Baran, Gentry, Pattison, & Heggstad, 2010). By constraining it to be zero, we did not allow the surface to be curved along the line of congruence. The term $b_3-b_4+b_5$ from the second constraint is also a common parameter in RSA named “ a_4 ”, which describes the form of the surface’s curvature above the line of incongruence (e.g., Cohen et al., 2010; Shanock et al., 2010). By constraining it to be negative, we imposed the expected inverted u-shaped form of the surface along the line of incongruence (see Figure 1b). The term from the third constraint, $(b_2-b_1)/4b_3$, which is usually labeled “C”, describes how far the optimum of this inverted u-shaped curve (i.e., the ridge with the highest interpersonal outcomes) is shifted from the line of congruence (Schönbrodt, 2016b). A negative value indicates that the ridge of the surface is shifted into the grey area of positive illusions as depicted in Figure 1b. Finally, the fourth constraint imposes a symmetry that makes the ridge of the surface parallel to the line of congruence (Schönbrodt, 2016b).⁶ In the following, we will call this model the *PI-Consequences-Model*.

Strategy of analysis. We computed several RSAs. In each RSA, we entered the partner perception as Predictor 1 and one of the two reality benchmarks as Predictor 2 and one of the dependent measures as Outcome. For each combination of reality benchmark and dependent measure, an RSA was conducted. This resulted in six RSAs for the first romantic encounter

which tested the PI-Existence-Model, and six RSAs for the subsequent encounter outcomes which tested the PI-Consequences-Model. For each RSA, we applied the following strategy of analysis:

First, we tested whether the full model (i.e., the model in which all parameters in Equation 1 were estimated freely) explained significant variance in the data by testing the R^2 of the full model against zero. If the full model did not explain significant variance in the data, the analysis stopped here because this meant that there was no detectable relation at all between the predictors and the dependent measure.

Second, we tested whether the hypothesized model (i.e., the PI-Existence-Model for the six first encounter analyses and the PI-Consequences-Model for the six subsequent encounter analyses) fit the data. To do so, we tested whether the hypothesized model had a significantly better fit than the null model (i.e., intercept only model) and had no significantly worse fit than the full model, using the χ^2 -difference test. We regarded the hypothesized model as fitting the data only if *both* conditions were satisfied. This stands in contrast to the classic null hypothesis significance testing approach, which tests only against the null model but does not test whether there might be a better explanation for the data (as we do by testing against the full model). If the hypothesized model did not fit the data according to these two criteria, the analysis stopped here.

Third, if the hypothesized model fit the data, we inspected its crucial estimated parameters to ensure that the model indeed described the proposed effect. This is necessary because a model can fit the data even when some of its crucial estimated parameters are not statistically significant—in which case the model would not describe the proposed effect and thus could not be interpreted as providing support for our hypotheses (see Schönbrodt, 2016b). For the PI-Existence-Model, this meant that the estimated b_1 had to be significantly positive and the estimated b_2 had to be significantly negative. For the PI-Consequences-

Model, this meant that both the estimated a_4 (i.e., $b_3 - b_4 + b_5$) and the estimated C (i.e., $[b_2 - b_1]/4b_3$) in the data had to be significantly negative (see also Schönbrodt, 2016b). Only then our hypothesis was confirmed.

If we did not find support for our hypothesis in an analysis (either because the hypothesized model did not fit the data in Step 2 or because the estimated parameters did not describe the proposed effect in Step 3) and the full model explained significant variance in Step 1, we conducted exploratory analyses to find out which effects were revealed by the data. To do so, we examined the full model for the respective analysis and inspected its regression coefficients b_1 to b_5 and their statistical significance. We also inspected the RSA parameters of the full model. These include parameters a_2 and a_4 introduced above (which describe the curvature of the surface above the line of congruence and above the line of incongruence, respectively), as well as parameters a_1 and a_3 , which describe the slope of the surface above the line of congruence and above the line of incongruence, respectively (e.g., Cohen et al., 2010).

The RSA analyses in the present paper were conducted using an adapted version of the *RSA* package for R (Schönbrodt, 2016a). Each rating by a given participant about a given dating partner and the respective corresponding value of the reality benchmark and of the dependent measure was entered into the RSAs as a separate observation. As each participant rated up to five dating partners, we thus included up to five data points per participant. The actual sample size in the analyses was therefore much larger than the number of participants. If for a given rater-target combination there was at least one missing value in the required data triplet (partner perception, reality benchmark, dependent measure), the respective data triplet was excluded from the analysis. This resulted in different sample sizes for different RSAs (see the Results section for the number of observations entered into each analysis).

As each rater rated multiple (i.e., up to five) targets, and each target was rated by multiple (i.e., up to five) raters in our speed-dating event, the data had a cross-classified multilevel structure (targets nested in raters and raters nested in targets). However, taking this structure into account by computing multilevel RSAs was not possible in the present case due to the small number of observations nested in raters/targets (which was a maximum of five per rater/target and thus not enough to estimate the five free parameters of an RSA per rater/target). This resulted in a higher number of independent cases in our analyses than there actually were, which we accounted for by adjusting the significance level to $\alpha = .01$ for all analyses. We interpreted p -values between .01 and .05 as marginally significant.

Prior to each RSA, both predictors (i.e., partner perception and reality benchmark) were standardized, using the pooled mean and standard deviation of the two predictors. The pooled mean and standard deviation were used in order to retain the meaning of the numerical distance between the two predictors. The outcome measure in each RSA was also standardized.

In some minor ways, the analyses conducted in the present paper had to be adapted from the preregistered analyses. See the online supplemental materials at http://osf.io/bd8xg/?view_only=4730ba3473e24f7bdd8bede2aafd0fa for a list of all changes and our rationale behind them. Data and analysis code for reproducing the results presented in the present paper can be accessed at http://osf.io/bd8xg/?view_only=4730ba3473e24f7bdd8bede2aafd0fa.

Results

Descriptive statistics of all measures and intercorrelations between all measures can be found in Tables 1 and 2, respectively.

Existence of Positive Illusions in First Romantic Encounters

Results revealed a consistent pattern across all six analyses that tested the PI-Existence Hypothesis. For all six analyses, the full model explained significant variance and, as expected, the PI-Existence-Model fit the data significantly better than the null model (see Table 3), indicating that—according to null hypothesis significance testing standards—our proposed model could explain the data in all six analyses. If we had stopped our analyses at this point (as is customary in null hypothesis significance testing), we would (falsely) have concluded that our hypothesis was confirmed. Instead, we also tested the PI-Existence-Model against the full model and, contrary to our expectations, the PI-Existence-Model fit the data significantly worse than the full model in all six analyses (see Table 3). This indicated that there was a better way to explain the data than by our hypothesis. Thus, our hypothesis (i.e., the higher the romantic attraction to a potential partner, the stronger the overestimation of this potential partner's characteristics) was not confirmed by the data.

As described above, we therefore conducted exploratory RSAs for each of the six reality benchmark $\times$ dependent measure combinations to inspect which effects were revealed by the data. The results of these analyses can be found in Figure 2 and Table 4. Consistent across all analyses, there was a linear positive main effect of partner perception (indicated by the significantly positive b_1 parameters), indicating that the more romantically attractive a participant found a dating partner, the more positively the participant perceived the dating partner's characteristics and attributes—completely regardless of the dating partner's actual characteristics (which differentiates this effect from an effect of positive illusions). With one exception (i.e., the analysis with the long-term appeal dependent measure and the self-perception reality benchmark), there was also a linear positive main effect of the reality benchmark throughout all analyses (indicated by the significantly positive b_2 parameters): The more positive a dating partner's characteristics and attributes actually were, the more

romantically appealing she/he was rated to be. This effect emerged regardless of the kind of reality benchmark used (i.e., self-perception or consensus rating). Throughout, however, the effect was descriptively larger for the consensus rating benchmark than for the self-perception benchmark. Furthermore, the linear main effect of the partner perception was in almost all analyses descriptively larger than the respective linear main effect of the reality benchmark (except for the analysis with the short-term appeal dependent measure and the consensus rating reality benchmark, for which the two effects were approximately equal in size).

Some analyses also revealed further effects. There was a positive quadratic effect of partner perception in the analysis with the romantic appeal dependent measure and the self-perception benchmark as well as in both analyses with the long-term appeal dependent measure (although the effect was only marginally significant in the analysis with the consensus rating benchmark): The positive effect of partner perception was not strictly linear in these analyses but slightly exponentially increasing, meaning that the higher the romantic attraction, the higher its impact on the positivity of partner perception. Furthermore, there was one marginally significant positive interaction effect between partner perception and reality benchmark in the analysis with the short-term appeal and the consensus benchmark, that is, the effects of the two predictors mutually augmented each other. However, as this effect emerged in only one of the six exploratory analyses (whereas in all other analyses, the effects of partner perception and reality benchmark were additive), and as this effect was only marginally significant, we refrain from interpreting this single interaction effect as long as it is not replicated in an independent data set.

None of the six exploratory analyses, however, revealed any indication of an effect of positive illusions, be it linear or curvilinear: Neither was parameter a_4 significant in any analysis (which would have indicated a possible curvilinear effect of positive illusions), nor

was there any tendency for the slope above the line of incongruence (indicated by the a_3 parameters) to be steeper than the slope above the line of congruence (indicated by the a_1 parameters) in any analysis (which might at least have pointed to a tendency for a linear effect of positive illusions). Thus, the present findings revealed no indication of an effect of positive illusions in first romantic encounters.

Consequences of Initial Positive Illusions in Subsequent Romantic Encounters

Results of testing the PI-Consequences Hypothesis (i.e., an inverted u-shaped effect of initial positive illusions on interpersonal outcomes in subsequent romantic encounters) are presented in Table 5. Unexpectedly, in all but one of the six analyses, the full model did not explain a significant amount of variance in the data, indicating that in these analyses, there was no detectable relation between predictors and dependent measure. And even in the one analysis in which the full model did explain significant variance (i.e., with subsequent romantic attraction as outcome and the consensus rating as reality benchmark), the PI-Consequences-Model was not confirmed, and the subsequent exploratory RSA did not reveal a single significant effect (the detailed results of these analyses can be found in the Appendix). Thus, the present findings provided no indication of any relation between initial positive illusions at the speed-dating event and later interpersonal outcomes. What is more, they also did not reveal any other relation between reality benchmark or partner perception at the speed-dating event and later interpersonal outcomes.

It is important to note that the sample used in the analyses on the subsequent encounter outcomes differed in two central aspects from the sample used in the analyses that tested the PI-Existence Hypothesis. First, only participants who had at least one match at the speed-dating event could take part in the three follow-ups and then reported only on their matching partners. As a consequence of this selection within our sample, the variance in our measures was somewhat reduced (although not drastically so, see Table 1). Second, and also as a

consequence of the selection within our sample, the number of rater-target combinations who could provide data for the subsequent encounter analyses was greatly reduced (to a maximum of $n = 298$ if all eligible participants had participated in the follow-ups). As there was also some participant attrition after the speed-dating event, the sample sizes in the subsequent encounter analyses were markedly smaller than the sample sizes in the analyses for testing the PI-Existence Hypothesis (see Table 5 for the sample sizes of the subsequent encounter analyses and Table 3 for the sample sizes of the analyses that tested the PI-Existence Hypothesis).

Discussion

The aim of the present research was to examine whether positive illusions already occur in the perception of appealing potential romantic partners in first romantic encounters and whether such initial positive illusions about a potential partner show beneficial interpersonal consequences in subsequent romantic encounters with the potential partner. To our knowledge, the present research was the first to examine the occurrence of positive illusions and their consequences in first and subsequent romantic encounters rather than in already established romantic relationships. We expected positive illusions to already emerge in first romantic encounters (PI-Existence Hypothesis) and to show beneficial interpersonal consequences in subsequent romantic encounters in an inverted u-shaped kind of way (PI-Consequences Hypothesis). We investigated these hypotheses with data from a large longitudinal speed-dating study and by applying different reality benchmarks as well as several different operationalizations of romantic appeal and interpersonal consequences.

Results Pertaining to the Existence of Positive Illusions in First Romantic Encounters

The present findings did not support our hypothesis regarding the existence of positive illusions in first romantic encounters. Positive over-perception of potential partners' characteristics and attributes did not increase with greater romantic attraction to a potential

partner, which would have indicated an effect of positive illusions in initial romantic encounters. This was true regardless of the kind of reality benchmark used and regardless of the operationalization of romantic attraction. Thus, the present findings yielded no evidence of positive illusions in the perception of potential partners in a first romantic encounter.

Although there were no positive illusions, our exploratory analyses revealed several other effects of partner perception and of the target's real characteristics in the initial romantic context of a speed-dating. First and foremost, romantic attraction was strongly associated with the positivity of partner perception: The more participants felt attracted to a potential dating partner, the more positively they perceived the dating partner's characteristics and attributes, regardless of the dating partner's actual level on these characteristics and attributes. This effect emerged in all of our analyses and is consistent with prior research on initial romantic encounters that also found this effect (e.g., Eastwick & Finkel, 2008; Fisman et al., 2006; Fletcher et al., 2014). The present findings, in addition, provided some initial evidence that this association between romantic attraction and positivity of partner perception might not be strictly linear in nature but rather somewhat exponentially increasing (i.e., the effect might be stronger at higher levels of romantic attraction). However, this curved effect was very small and emerged in only half of our analyses (in one of which it was only marginally significant). Thus, this slightly curvilinear nature of the effect should first be replicated before drawing any conclusions. And even if a replication were to confirm the curvilinear nature of the effect, a linear approximation of the effect might most likely be sufficient for most research contexts, as the present findings indicate that the curvilinear effect might be very small.

Furthermore, the exploratory analyses consistently (except for one analysis) yielded evidence of a positive association between the reality benchmark and romantic attraction: The more positive a dating partner's characteristics and attributes actually were, the more

attracted participants felt to that dating partner. This effect emerged for both kinds of reality benchmarks. That is, participants felt more strongly romantically attracted both to dating partners who perceived themselves more positively and to dating partners who were consensually rated as having more positive characteristics. However, the association between romantic attraction and consensus benchmark was consistently larger than the association between romantic attraction and self-perception benchmark. This difference between the two kinds of benchmarks might have several reasons. First, the consensus rating was formed in the same situation as each of the attraction ratings (i.e., in the speed-dating context) and in the presence of very similar cues as each of the attraction ratings. Therefore, the consensus benchmark might have shown a stronger association with the attraction ratings than the self-perception benchmark, which (a) was not assessed concurrently with the attraction ratings in the speed-dating situation (but in an online questionnaire before the speed-dating event) and (b) most likely also included self-representations of and self-knowledge about situations outside the dating context that could not be observed by the raters in the speed-dating event and therefore could not be reflected in the attraction ratings. Second, the self-ratings might have been biased (e.g., Alicke & Sedikides, 2011; Taylor & Brown, 1988, 1994). Such biases likely also could not be observed by the raters and therefore were not likely to be reflected in the attraction ratings, which might have further reduced the association between self-rating benchmark and romantic attraction ratings. The present findings thus indicate that the two kinds of reality benchmarks might differ in their predictive validity in early-stage romantic encounters. This difference between the two kinds of benchmarks might be less pronounced when examining established romantic relationships (as shown by Murray et al., 2000, but see also Barelds et al., 2011) because romantic partners most likely have insight into how their partner perceives him- or herself, thus reducing (or probably even overcoming) the information gap between self-perception benchmark and consensus benchmark.

Results from the exploratory analyses furthermore revealed that the effect of the reality benchmark on romantic attraction was almost always (i.e., with only one exception) smaller than the effect of the partner perception on romantic attraction. This indicates that for the romantic attraction people feel toward a potential partner, it seems more important how people *perceive* a potential partner's characteristics and attributes than how a potential partner's characteristics and attributes actually *are*. This is in line with findings from prior studies that investigated the impact of both perceived and actual partner characteristics on initial romantic attraction and also found evidence for a stronger impact of subjectively perceived partner characteristics (e.g., Byrne, Ervin, & Lamberth, 1970; Eastwick & Finkel, 2008; Fletcher et al., 2014; Walster, Aronson, Abrahams, & Rottman, 1966; see also Eastwick, Luchies, Finkel, & Hunt, 2014; Montoya, Horton, & Kirchner, 2008).

Finally, we would like to stress that we would have reached very different conclusions regarding the existence of positive illusions in first romantic encounters if we had followed a classic null hypothesis significance testing approach. If we had tested our hypothesis against only the null hypothesis (i.e., the null model) as is the case in null hypothesis significance testing, we would have concluded that our hypothesis was confirmed and that indeed positive illusions already occur in first romantic encounters because in all our analyses the null hypothesis was rejected (i.e., the PI-Existence-Model fit the data significantly better than the null model). Only by also including a test against the full model (which is not part of the classic null hypothesis significance testing procedure), we were able to detect that there was an even better explanation for the data (i.e., the main effects reported above) than the explanation provided by our hypothesis and thus that there actually was *no* occurrence of positive illusions in the initial romantic encounter. This again illustrates the importance of considering alternatives to the null hypothesis significance testing procedure such as testing whether there might be an even better explanation for the data—for example by testing

against a full model or against alternative hypotheses. Future research on positive illusions might therefore consider routinely implementing such an approach.

Results Pertaining to Beneficial Interpersonal Consequences of Initial Positive Illusions in Subsequent Romantic Encounters

The present findings did not support our hypothesis that positive illusions in a first romantic encounter would have beneficial interpersonal consequences in subsequent romantic encounters in an inverted u-shaped kind of way. We found no evidence of any impact of initial positive illusions on subsequent interpersonal outcomes. In fact, there was no detectable relation at all between the predictors assessed at the speed-dating event and subsequent interpersonal outcomes. That is, neither partner perception at the speed-dating event, nor the dating partner's actual characteristics (as self-rated by the dating partner prior to the speed-dating event or as consensually rated by all opposite-sex participants at the speed-dating event) had any influence on outcomes in subsequent romantic encounters. This was true regardless of the kind of interpersonal outcome analyzed.

There are several possible reasons for this lack of association between initial predictors and later outcomes. First, the sample size in the subsequent encounter analyses was reduced. Thus, statistical power to detect potential effects was reduced: The power to detect a medium-sized effect in the model comparisons was 73.16%, 74.67%, and 55.73% for the subsequent romantic attraction analyses, the contact frequency analyses, and the relationship quality analyses, respectively (whereas power was > 99.99% in all analyses that examined the PI-Existence Hypothesis. Power was computed using G*Power Version 3.1.5; Faul, Erdfelder, Buchner, & Lang, 2009). Second, as only matching pairs remained in the follow-up sample, the variance in our measures was somewhat reduced. Although this reduction in the variance in our measures was not very pronounced, it might nonetheless have reduced the predictive power of our analyses. Third, subsequent interpersonal outcomes between the

daters might have been more strongly influenced by what happened after the speed-dating event than by participants' initial perceptions at the speed-dating event. For example, further interactions between matching partners most likely yielded new information about a matching partner's characteristics and attributes and thus might have changed or updated the initial impressions and partner perceptions from the speed-dating event over time. As a consequence, the original (and by then probably outdated) impressions assessed at the speed-dating event might have had no more influence on interpersonal outcomes in subsequent encounters.

Future research should try to disentangle which of these three possible explanations (or combinations thereof) were responsible for the unexpected lack of association between initial predictors and later outcomes in the present findings. It might be especially interesting to examine the third possible explanation in detail: Whether and how do partner perceptions change in the weeks following a first date? And what potential factors of influence might impact such a potential change in partner perceptions (i.e., personality characteristics of the rater or characteristics of the dating situation such as the duration of the dates or the degree to which the activities during a date allowed the traits and attributes of the daters to be expressed)? Identifying which factors influence the course of romantic relationship formation might be one of the major challenges for future research on dating.

Implications of the Present Findings

The present findings have several implications for empirical and theoretical research on (a) positive illusions and (b) romantic attraction and partner choice. Regarding research on positive illusions, the present findings provided first evidence that positive partner illusions do not seem to be present in first romantic encounters. Thus, perceiving a romantic partner's characteristics and attributes as more positively than they actually are seems to be a mechanism specific to more advanced stages of romantic acquaintanceships (as shown for

established romantic relationships, e.g., Fletcher & Kerr, 2010; Murray et al., 1996a, 1996b).

The notion that positive partner illusions do not seem to be present in first romantic encounters also informs research on the psychological processes that underlie positive illusions. The present findings render it unlikely that positive illusions about a romantic partner emerge mainly as a result of filling in knowledge gaps about the partner with an idealized image (e.g., Murray et al., 1996a, 1996b; Niehuis et al., 2011)—because if this was the main underlying mechanism, positive illusions should have been especially pronounced in first romantic encounters where the gaps in knowledge are largest. Thus, the occurrence of positive illusions in established romantic relationships rather seems to be a result of the reinterpretation of the information people have about their romantic partners (e.g., downplaying a partner's faults or changing the meaning of the faults) with the main function of securing an already existing bond (e.g., Murray & Holmes, 1999; Murray et al., 1996a, 2003; Schaffhuser et al., 2016). Support for the supposition that the main function of positive illusions is to secure an already existing bond comes from research on decision making. It has been shown that biased perceptions such as positive partner illusions seem to be especially pronounced when people are in a mindset with the goal of maintaining their current romantic relationship (i.e., a post-decisional mindset) but less so when people are in a deliberative mindset, preparing to make a relationship decision (Gagné & Lydon, 2004; see also Fletcher, 2015; Taylor & Gollwitzer, 1995). This in turn is in line with the present findings of no positive illusions in the context of a speed-dating event, which is a highly decision-intensive situation as participants have to decide for each of their dating partners whether they want to exchange contact information. Taken together, thus, the present findings as well as prior research on decision making suggest that some kind of existing bond or at least a previously reached decision to create such a bond might be required for positive illusions to occur.

Regarding the implications for research on romantic attraction and partner choice, the present findings suggest that subjectively perceived partner characteristics might be a better predictor of romantic attraction and partner choice than more objective measures of a potential partner's characteristics (see also Eastwick & Finkel, 2008; Fletcher et al., 2014). This is not surprising because it is a person's subjective perception of a potential partner's characteristics (rather than the objective reality) that will influence the internal decision processes that lead to the choice of a partner. Investigating subjective partner perceptions is thus essential for understanding the psychological processes that underlie romantic attraction and human mate selection. In the light of these implications, it is surprising that the majority of the existing research on initial romantic attraction has focused on only the impact of objectively measured partner characteristics rather than on the impact of subjectively perceived partner characteristics (e.g., Asendorpf, Penke, & Back, 2011; Hitsch, Hortaçsu, & Ariely, 2005; Kurzban & Weeden, 2005; Lenton & Francesconi, 2010; Luo & Zhang, 2009; Todd, Penke, Fasolo, & Lenton, 2007; for exceptions, see Eastwick & Finkel, 2008; Fisman et al., 2006; Houser, Horan, & Furler, 2008; Tidwell, Eastwick, & Finkel, 2013; see also Fletcher et al., 2014). The present findings thus underscore the importance of assessing subjective partner perceptions in addition to objectively measured partner characteristics in research on romantic attraction and partner choice. Such a combined assessment of subjectively perceived and objectively measured partner characteristics will furthermore allow researchers to investigate which objective partner characteristics influence subjective partner perceptions in initial romantic encounters.

Finally, the present research illustrates the main challenges that researchers have to deal with when investigating the long-term consequences of initial romantic encounters: (a) reduced variance in the subsequent encounter sample as a consequence of the selection process after the initial romantic encounter (i.e., because not all individuals want to meet all

of their dating partners for a second time), (b) participant attrition over the course of time, (c) the need to assess other potential factors of influence between assessments—without yet knowing *which* factors might have an influence during the transition from initial romantic encounters to serious dating as there is almost no prior research to draw from (Campbell & Stanton, 2014), and without overloading participants with long item lists during each assessment. To master these challenges and longitudinally track the formation and development of romantic relationships, as has often been called for (e.g., Campbell & Stanton, 2014; Wurst et al., 2017), careful pilot testing, huge initial sample sizes (e.g., by pooling data across research labs to reach even larger sample sizes than the 398 participants of the present study), and probably quite an amount of participant payment may be required (for other studies that longitudinally tracked the formation of romantic relationships, see Asendorpf et al., 2011; Campbell, Chin, & Stanton, 2016; Eastwick & Finkel, 2008). We hold that the potentially large gains in information from longitudinal studies that investigate the transition processes between initial romantic encounters and the later formation of a romantic relationship might be worth the effort and the costs, as almost nothing is known about these processes yet.

Limitations and Future Directions

Although we used broad sampling across different majors to recruit participants, the present sample was still specific in the sense that participants were all highly educated and were mostly students. Future research is needed to examine whether the present findings generalize to non-student and less-educated samples. Furthermore, drop-out in the present follow-up assessments was considerable (of the original 398 participants, only 197 were eligible to take part in the follow-ups as they had at least one match, and only 103 participants actually provided follow-up data on the measures analyzed in the present paper). This indicates that future studies with a similar longitudinal design might require an even

larger initial sample to obtain satisfactory statistical power for analyzing long-term interpersonal outcomes between daters.

Despite these obstacles and the abovementioned challenges, we encourage future research to longitudinally track the formation of romantic relationships from initial romantic encounters to the later development of a romantic relationship and its maintenance, as this will allow a series of further crucial questions about positive illusions to be answered: When in the process of relationship formation or relationship maintenance do positive partner illusions start to occur? The present findings indicate that they are not yet present in initial romantic encounters, but the bulk of prior research suggests that they do appear in established romantic relationships (e.g., Fletcher & Kerr, 2010). As deduced above, for positive illusions to occur, some kind of existing bond or at least an existent decision to create such a bond might be required. But what kind of bond or decision is required? Do positive illusions emerge only after deciding to enter a committed romantic relationship with a person? Or do they emerge as early as the first feelings of infatuation toward a potential partner sprout during the course of dating? Positive illusions might already be functional during the course of dating and courtship as they might contribute to motivating a person to put effort into courting and to maintain this motivation throughout the high uncertainty of the courtship period. On the other hand, during the course of dating, it might also be adaptive to not overestimate a potential partner's characteristics and attributes and thus gain a realistic picture to be able to make a well-informed decision about whether to enter a committed relationship with this person. To answer these questions about the onset of positive illusions, future research should repeatedly assess partner perceptions, reality benchmarks, and interpersonal outcomes throughout the entire process of dating and relationship formation. The present findings further indicate that it might be sensible to assess different kinds of reality benchmarks. Even if the difference between different kinds of reality benchmarks might be

less pronounced when established romantic relationships are examined (Murray et al., 2000; but see also Barelds et al., 2011), the present findings indicate that a consensus benchmark might be more suitable than a self-rating benchmark for investigating positive illusions in early-stage romantic contexts.

An intensive longitudinal design on positive partner illusions would also allow researchers to examine another set of important unanswered questions: When do the beneficial consequences of positive partner illusions arise? Do they develop concurrently with positive illusions? That is, do positive illusions about a (potential) partner already show beneficial outcomes from the very moment in which these positive illusions can first be detected? Or does it take some time after initial positive illusions about a (potential) partner have developed before these positive illusions unfold their beneficial consequences? And if so, how long does it take?

Future research might furthermore investigate whether and to what extent positive illusions and their beneficial consequences occur in other kinds of romantic or interpersonal relationships: Are there positive partner illusions in uncommitted romantic relationships, such as sexual affairs? And do people have positive illusions about their children or other relatives, about friends, or about coworkers? By comparing the amount of positive illusions in these different kinds of relationships, researchers might be able to gain insight into what characteristics of a relationship (e.g., commitment, physical intimacy, emotional bonding, etc.—or combinations thereof) are prerequisites for or foster positive illusions and their beneficial consequences. This knowledge might then, in turn, help to refine the understanding of the psychological processes underlying positive illusions. Knowing in which kinds of interpersonal relationships positive illusions and their beneficial consequences occur would furthermore contribute to answering another crucial question that future relationship research should tackle (e.g., Back & Vazire, 2015): Which psychological mechanisms are unique to

specific kinds of interpersonal relationships and which mechanisms are shared across different kinds of interpersonal relationships?

Finally, future research on the effects of positive illusions might profit from using the RSA methodology. RSA allows researchers to disentangle and simultaneously estimate the effect of the discrepancy and the main effects of its constituent parts (including quadratic effects), thus eluding the confounds inherent in difference scores or regression residuals (e.g., Cohen et al., 2010; Edwards, 2007; Nestler et al., 2015). RSA furthermore easily allows positive illusion models to be tested against a full model to rule out the possibility that there might be an even better explanation for the data than the hypothesized effect of positive illusions (e.g., Edwards, 2002; Schönbrodt, 2016b).

Conclusion

The present research is the first to examine the occurrence of positive partner illusions and their beneficial consequences in initial romantic encounters. We found no evidence of positive illusions or their beneficial interpersonal consequences in initial romantic encounters, indicating that positive illusions and their consequences begin to emerge at a later point in the process of dating or relationship formation. It is now up to future research to identify the point or stage of romantic acquaintanceship at which positive partner illusions start to emerge and to shed light on the psychological processes underlying the emergence of positive partner illusions. We hope that the theoretical insights and methodological recommendations provided by the present paper might help future research on this quest.

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Footnotes

¹ There are also a number of other idealization phenomena in romantic relationships. For example, people believe that their own current romantic relationship is better than other romantic relationships (e.g., Fowers, Lyons, & Montel, 1996; Fowers, Lyons, Montel, & Shaked, 2001; Martz et al., 1998; Van Lange & Rusbult, 1995), have idealized memories about past events in their current romantic relationship (e.g., Fletcher & Kerr, 2010; Karney & Coombs, 2000; Karney & Frye, 2002), have an illusion of control over their romantic relationship (e.g., Murray & Holmes, 1997), and overestimate their own similarity to their romantic partner (e.g., Murray, Holmes, Bellavia, Griffin, & Dolderman, 2002). These phenomena are not directly relevant for the present paper and will therefore not be discussed further in this article.

² Originally, we were also interested in whether raters' personality traits predicted positive illusions about potential partners in first romantic encounters. Prior research has yielded evidence that some of the Big Five personality traits might influence the occurrence of positive illusions about a romantic partner in established romantic relationships (Barelids & Dijkstra, 2011). Furthermore, (trait) positive affect has been found to be related to more positive perceptions of the world (e.g., Forgas, 1995; Raila, Scholl, & Gruber, 2015) and might thus also promote positive illusions about potential partners. However, our analyses revealed no association between the Big Five traits or trait positive affect and positive illusions. Personality determinants of positive illusions will therefore not be discussed in the present paper. Descriptions and results of the analyses we conducted on personality influences can be found in the online supplemental materials at http://osf.io/bd8xg/?view_only=4730ba3473e24f7bdd8bede2aafd0fa.

³ Please see the online supplemental materials for details about how we selected the partner characteristics used for the present research.

⁴ The verbal labels of the scale used in Follow-Up 3 were slightly different because the time since the last assessment was twice as large as for the other follow-ups. Thus, for the scale values to represent equivalent degrees of contact frequency throughout all follow-ups (i.e., contact/day), the verbal labels in Follow-Up 3 were adjusted.

⁵ We did not compute Cronbach's alpha for these aggregations because it is very likely that frequency of contact was not consistent across the different kinds of contact (personal, written, phone). Cronbach's alpha would therefore not provide an appropriate indication of reliability (Bollen & Lennox, 1991; Streiner, 2003).

⁶ This model is thus equivalent to a Shifted Rising Ridge model as defined by Schönbrodt (2016b) with the curvature above the line of incongruence being constrained to an inverted u-shape and the ridge being constrained to be shifted to the right of the line of congruence. Please note that we allowed the ridge of the surface to be rising (or falling) along the line of congruence, as it is irrelevant to our hypothesis whether the ridge is rising/falling or whether it is flat (as depicted in Figure 1b).

Table 1

Descriptive Statistics of all Assessed (Unstandardized) Measures

Measure	<i>n</i>	<i>M</i>	<i>SD</i>	min	max
Partner perception	1896	4.62	0.73	1.59	6.78
Reality benchmarks:					
Self-perception	1888	5.02	0.54	3.44	6.41
Consensus rating	1896	4.62	0.50	2.75	5.75
Outcomes:					
Romantic appeal	1896	3.45	1.77	1.00	7.00
Short-term appeal	1896	2.68	1.95	1.00	7.00
Long-term appeal	1896	3.06	1.80	1.00	7.00
Romantic attraction (follow-up)	152	3.52	1.61	1.00	7.00
Contact frequency (follow-up)	156	1.96	0.99	1.00	5.67
Relationship quality (follow-up)	114	2.99	1.23	1.00	6.40

Table 2

Pearson's Zero-Order Correlations Between all Measures Assessed

Measure	Partner perception	Self-perception	Consensus rating	Romantic appeal	Short-term appeal	Long-term appeal	Rom. attr. (f.-up)	Cont. freq. (f.-up)
Partner perception	--							
Reality benchmarks:								
Self-perception	.23	--						
Consensus rating	.68	.33	--					
Outcomes:								
Romantic appeal	.70	.22	.57	--				
Short-term appeal	.43	.18	.41	.65	--			
Long-term appeal	.63	.17	.49	.83	.61	--		
Romantic attraction (follow-up)	.27	.09	.23	.50	.44	.47	--	
Contact frequency (follow-up)	.10	-.03	.08	.25	.16	.30	.55	--
Relationship quality (follow-up)	.14	-.01	.03	.25	.14	.32	.65	.76

Note. Significant correlations ($p < .01$, two-tailed) are presented in boldface.

Table 3

Results of the Confirmatory Test of the PI-Existence-Hypothesis-Model in First Romantic Encounters

Outcome measure	Reality benchmark	<i>n</i> ^a	RSA model	Step 1		Step 2				Model confirmed against null/full model?
				<i>R</i> ²	<i>p</i> (<i>R</i> ²)	<i>df</i>	χ^2	$\Delta\chi^2_s$	<i>p</i> ($\Delta\chi^2_s$)	
Romantic appeal	Self-perception	1888	PI-Existence-Model	.50	<.001	3	41.40			
			Null			5	1330.70	1912.87	<.001	Yes
			Full	.51	<.001	0	0.00	39.99	<.001	No
	Consensus rating	1896	PI-Existence-Model	.49	<.001	3	101.57			
			Null			5	1390.05	1923.78	<.001	Yes
			Full	.52	<.001	0	0.00	93.30	<.001	No
Short-term appeal	Self-perception	1888	PI-Existence-Model	.19	<.001	3	18.61			
			Null			5	411.32	765.23	<.001	Yes
			Full	.20	<.001	0	0.00	15.24	.002	No
	Consensus rating	1896	PI-Existence-Model	.19	<.001	3	69.83			
			Null			5	464.58	769.01	<.001	Yes
			Full	.22	<.001	0	0.00	58.89	<.001	No
Long-term appeal	Self-perception	1888	PI-Existence-Model	.40	<.001	3	34.94			
			Null			5	990.90	1496.35	<.001	Yes
			Full	.41	<.001	0	0.00	32.00	<.001	No
	Consensus rating	1896	PI-Existence-Model	.40	<.001	3	60.23			
			Null			5	1014.92	1500.79	<.001	Yes
			Full	.42	<.001	0	0.00	54.63	<.001	No

Note. n = number of observations entered into each RSA; Step 1 = test of whether the full model explained significant variance in the data; R^2 = amount of variance explained by the respective RSA model; Step 2 = χ^2 -difference test of whether the PI-Existence-Model fit the data significantly better than the null model and not significantly worse than the full model; df = degrees of freedom of the respective RSA model; $\Delta\chi^2_s$ = scaled χ^2 -difference (Satorra & Bentler, 2001; see Rosseel, 2016) between null/full model and the PI-Existence-Model.

^a The number of observations in the analyses with the self-rating benchmark was reduced because we had no self-rating data from the two participants who retracted their data. Therefore, all observations that included these two participants as targets had to be excluded from the analyses with the self-rating benchmark.

Table 4

Parameter Estimates (Including Statistical Significance and 99% Confidence Intervals) of the Exploratory RSAs (Full Model) for the First Romantic Encounter Data

RSA	Regression coefficient														
	b ₁			b ₂			b ₃			b ₄			b ₅		
	Est.	[99% CI]	<i>p</i>	Est.	[99% CI]	<i>p</i>	Est.	[99% CI]	<i>p</i>	Est.	[99% CI]	<i>p</i>	Est.	[99% CI]	<i>p</i>
RS	0.67	[0.63, 0.72]	<.001	0.09	[0.02, 0.15]	.001	0.05	[0.03, 0.07]	<.001	0.00	[-0.04, 0.04]	.982	0.00	[-0.06, 0.05]	.856
RC	0.51	[0.46, 0.55]	<.001	0.24	[0.17, 0.31]	<.001	0.02	[-0.02, 0.06]	.235	0.07	[-0.04, 0.18]	.103	-0.02	[-0.11, 0.07]	.649
SS	0.40	[0.33, 0.47]	<.001	0.09	[0.00, 0.18]	.007	0.02	[-0.01, 0.05]	.115	-0.01	[-0.08, 0.05]	.624	0.02	[-0.04, 0.09]	.331
SC	0.25	[0.19, 0.31]	<.001	0.28	[0.19, 0.38]	<.001	-0.02	[-0.07, 0.03]	.308	0.11	[-0.02, 0.23]	.031	-0.03	[-0.13, 0.06]	.368
LS	0.62	[0.57, 0.67]	<.001	0.05	[-0.02, 0.12]	.091	0.06	[0.04, 0.08]	<.001	0.01	[-0.04, 0.06]	.628	-0.01	[-0.07, 0.05]	.609
LC	0.48	[0.43, 0.53]	<.001	0.16	[0.08, 0.24]	<.001	0.04	[0.00, 0.08]	.021	0.04	[-0.08, 0.15]	.422	0.00	[-0.09, 0.10]	.929
RSA	RSA parameter														
	a ₁			a ₂			a ₃			a ₄					
	Est.	[99% CI]	<i>p</i>	Est.	[99% CI]	<i>p</i>	Est.	[99% CI]	<i>p</i>	Est.	[99% CI]	<i>p</i>			
RS	0.76	[0.70, 0.82]	<.001	0.05	[-0.01, 0.10]	.025	0.59	[0.50, 0.68]	<.001	0.05	[-0.04, 0.13]	.183			
RC	0.74	[0.70, 0.79]	<.001	0.07	[0.04, 0.11]	<.001	0.27	[0.15, 0.38]	<.001	-0.07	[-0.30, 0.16]	.447			
SS	0.49	[0.40, 0.58]	<.001	0.03	[-0.04, 0.10]	.279	0.31	[0.18, 0.44]	<.001	0.06	[-0.06, 0.17]	.220			
SC	0.53	[0.46, 0.60]	<.001	0.05	[0.00, 0.10]	.014	-0.03	[-0.18, 0.11]	.560	-0.16	[-0.42, 0.09]	.106			
LS	0.67	[0.60, 0.74]	<.001	0.06	[0.00, 0.12]	.016	0.57	[0.47, 0.68]	<.001	0.04	[-0.06, 0.13]	.297			
LC	0.64	[0.59, 0.70]	<.001	0.08	[0.04, 0.12]	<.001	0.32	[0.19, 0.44]	<.001	0.01	[-0.23, 0.24]	.954			

Note. RS = Romantic appeal outcome and Self-perception benchmark; RC = Romantic appeal outcome and Consensus benchmark; SS = Short-term appeal outcome and Self-perception benchmark; SC = Short-term appeal outcome and Consensus benchmark; LS = Long-term appeal outcome and Self-perception benchmark; LC = Long-term appeal outcome and Consensus benchmark; Est. = parameter estimate; CI = confidence interval for the parameter estimate. Parameters b₁ to b₅ denote the estimated regression coefficients in Equation 1, parameters a₁ to a₄

denote the estimated RSA parameters. b_1 = linear effect of partner perception; b_2 = linear effect of reality benchmark; b_3 = quadratic effect of partner perception; b_4 = interaction between partner perception and reality benchmark; b_5 = quadratic effect of reality benchmark; a_1 = slope of the response surface above the line of congruence; a_2 = curvature of the response surface above the line of congruence; a_3 = slope of the response surface above the line of incongruence; a_4 = curvature of the response surface above the line of incongruence.

Table 5

Results of the Confirmatory Test of the PI-Consequences-Hypothesis-Model in Subsequent Romantic Encounters

Outcome measure	Reality benchmark	n^a	RSA model	Step 1	
				R^2	$p(R^2)$
Romantic attraction	Self-perception	152	Full	.09	.013
	Consensus rating	152	Full	.10	.009
Contact frequency	Self-perception	156	Full	.02	.602
	Consensus rating	156	Full	.03	.526
Relationship quality	Self-perception	114	Full	.04	.454
	Consensus rating	114	Full	.04	.523

Note. n = number of observations entered into each RSA; Step 1 = test of whether the full model explained significant variance in the data (analyses stopped after this step, as the full model did not explain significant variance in any case except for one—results of the further analysis steps for this one case are presented in the Appendix); R^2 = amount of variance explained by the respective RSA model.

^a The number of observations differed between outcome measures, (a) because in the follow-up questionnaires, romantic attraction was assessed after the contact frequency measures and four participants stopped filling out the follow-up questionnaires after answering the contact frequency questions but before answering the romantic attraction question, and (b) because relationship quality—in contrast to the other two outcome measures—was assessed in only the rater-and-matching-partner combinations that had engaged in contact at least once after the speed-dating event.

Figure 1. Summary of our hypotheses. (a) RSA representation of the PI-Existence Hypothesis for a first romantic encounter: We expected a linear association between romantic attraction and positive over-perception of a potential partner's characteristics and attributes. (b) RSA representation of the PI-Consequences Hypothesis for subsequent romantic encounters: We expected an optimal degree of initial positive illusions, which should lead to the highest beneficial interpersonal outcomes in subsequent encounters. The grey triangle on the floor of the cubes represents the area of positive illusions. Lines *a* and *c* represent the line of congruence and the line of incongruence, respectively. Line *b* represents a certain degree of positive illusions (randomly chosen) and indicates the optimal degree of positive illusions in Graph (b). Points *P* and *Q* were included to explain the graphs and have nothing to do with the hypotheses.

Self-perception benchmark

Consensus benchmark

Dependent measure: romantic appeal:

$$\begin{aligned} b_1 &= 0.67 \\ b_2 &= 0.09 \\ b_3 &= 0.05 \\ b_4 &= 0.00 \\ b_5 &= 0.00 \\ a_1 &= 0.76 \\ a_2 &= 0.05^\dagger \\ a_3 &= 0.59 \\ a_4 &= 0.05 \end{aligned}$$

$$\begin{aligned} b_1 &= 0.51 \\ b_2 &= 0.24 \\ b_3 &= 0.02 \\ b_4 &= 0.07 \\ b_5 &= -0.02 \\ a_1 &= 0.74 \\ a_2 &= 0.07 \\ a_3 &= 0.27 \\ a_4 &= -0.07 \end{aligned}$$

Dependent measure: short-term appeal:

$$\begin{aligned} b_1 &= 0.40 \\ b_2 &= 0.09 \\ b_3 &= 0.02 \\ b_4 &= -0.01 \\ b_5 &= 0.02 \\ a_1 &= 0.49 \\ a_2 &= 0.03 \\ a_3 &= 0.31 \\ a_4 &= 0.06 \end{aligned}$$

$$\begin{aligned} b_1 &= 0.25 \\ b_2 &= 0.28 \\ b_3 &= -0.02 \\ b_4 &= 0.11^\dagger \\ b_5 &= -0.03 \\ a_1 &= 0.53 \\ a_2 &= 0.05^\dagger \\ a_3 &= -0.03 \\ a_4 &= -0.16 \end{aligned}$$

Dependent measure: long-term appeal:

$$\begin{aligned} b_1 &= 0.62 \\ b_2 &= 0.05 \\ b_3 &= 0.06 \\ b_4 &= 0.01 \\ b_5 &= -0.01 \\ a_1 &= 0.67 \\ a_2 &= 0.06^\dagger \\ a_3 &= 0.57 \\ a_4 &= 0.04 \end{aligned}$$

$$\begin{aligned} b_1 &= 0.48 \\ b_2 &= 0.16 \\ b_3 &= 0.04^\dagger \\ b_4 &= 0.04 \\ b_5 &= 0.00 \\ a_1 &= 0.64 \\ a_2 &= 0.08 \\ a_3 &= 0.32 \\ a_4 &= 0.01 \end{aligned}$$

Figure 2. Response surfaces and parameter estimates of the exploratory RSAs (full model) for the first romantic encounter data. The dots in the graphs represent the actual observed data points; the surfaces represent the predicted values from Equation 1. Each graph also depicts the line of congruence (front to back) and the line of incongruence (left to right). Parameters b_1 to b_5 denote the estimated regression coefficients in Equation 1 (b_1 = linear effect of partner perception, b_2 = linear effect of reality benchmark, b_3 = quadratic effect of partner perception, b_4 = interaction between partner perception and reality benchmark, b_5 = quadratic effect of reality benchmark), parameters a_1 to a_4 denote the estimated RSA parameters (a_1 = slope of the response surface above the line of congruence, a_2 = curvature of the response surface above the line of congruence, a_3 = slope of the response surface above the line of incongruence, a_4 = curvature of the response surface above the line of incongruence). Significant parameter estimates ($p < .01$, two-tailed) are presented in boldface. Daggers indicate marginally significant parameter estimates ($.01 \leq p < .05$).

Appendix: Subsequent Encounter Analyses: Results of the Confirmatory and Exploratory Analyses With Subsequent Romantic Attraction

Outcome and Consensus Benchmark

Table A1

Results of the Confirmatory Test of the PI-Consequences-Hypothesis-Model

Outcome measure	Reality benchmark	<i>n</i>	RSA model	Step 1		Step 2				Model confirmed against null/full model?	Step 3			
				R^2	$p(R^2)$	<i>df</i>	χ^2	$\Delta\chi^2_s$	$p(\Delta\chi^2_s)$		a_4	$p(a_4)$	C	$p(C)$
Romantic attraction	Consensus rating	152	PI-Consequences-Model	.08	.006	2	3.11				.00	-- ^a	-10983341.61	.836
			Null			5	15.88	18.77	<.001	Yes				
			Full	.10	.009	0	0.00	2.07	.355	Yes				

Note. *n* = number of observations entered into the RSA; Step 1 = test of whether the full model explained significant variance in the data; R^2 =

amount of variance explained by the respective RSA model; Step 2 = χ^2 -difference test of whether the PI-Consequences-Model fit the data

significantly better than the null model and not significantly worse than the full model; *df* = degrees of freedom of the respective RSA model;

$\Delta\chi^2_s$ = scaled χ^2 -difference (Satorra & Bentler, 2001; see Rosseel, 2016) between null/full model and the PI-Consequences-Model; Step 3 =

inspection of the crucial estimated parameters a_4 and C for whether they were both significantly negative. As they both were not, the PI-

Consequences-Model was not confirmed, and we continued with the exploratory analysis (see Figure A1 for the results).

^a The *p*-value of a_4 could not be computed as a_4 was estimated to be zero.

Figure A1. Response surface and parameter estimates (including statistical significance and 99% confidence intervals) of the exploratory RSA (full model) with subsequent romantic attraction outcome and consensus rating benchmark. The dots in the graph represent the actual observed data points; the surface represents the predicted values from Equation 1. The graph also depicts the line of congruence (front to back) and the line of incongruence (left to right). Parameters b_1 to b_5 denote the estimated regression coefficients in Equation 1 (b_1 = linear effect of partner perception, b_2 = linear effect of reality benchmark, b_3 = quadratic effect of partner perception, b_4 = interaction between partner perception and reality benchmark, b_5 = quadratic effect of reality benchmark), parameters a_1 to a_4 denote the estimated RSA parameters (a_1 = slope of the response surface above the line of congruence, a_2 = curvature of the response surface above the line of congruence, a_3 = slope of the response surface above the line of incongruence, a_4 = curvature of the response surface above the line of incongruence).