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Running head: Comparative optimism and career success

**Perceptions of Comparative Optimism and Perceptions of Career Success: Experimental
Evidence for a Bidirectional Effect**

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Abstract

Audiences generally view people who display more (versus less) comparative optimism more favorably. We explored whether audiences view a target who displays comparative optimism as more professionally successful and conversely, whether they view a target who is more professionally successful as more comparatively optimistic. In Study 1, participants estimated the career success of a target that varied in level of comparative optimism. In Study 2, participants estimated the level of comparative optimism of a target that varied in career success. The results revealed that observers rated comparative optimists as likely to have successful careers, and rated people with successful careers as likely to display comparative optimism. Inferences about personal agency account for the bidirectional relationship.

Key words: Comparative optimism, career success, agency, communion.

Perceptions of Comparative Optimism and Perceptions of Career Success: Experimental Evidence for a Bidirectional Effect

Western societies place a high value on optimism—having positive expectations about the future. Both self-improvement movements and the media extol the beneficial health consequences of optimistic thinking (for a review, see Sharot, 2012). Optimism also appears economically desirable. Economists have proposed that optimism is important to sustaining a strong economy (Keynes, 1936), influences the rate of investment in industry and thus the creation of new economic markets (Bougheas, 2002), and predicts successful economic behaviors such as hard work and greater earning, investing, and saving (Puri & Robinson, 2007). Consistent with this thinking, groups such as the Organization for Economic Cooperation and Development (OECD), track people's optimism through yearly barometers (OECD, 2017) and use it to predict future economic outcomes. The link between optimism and economic success (Puri & Robinson, 2007) suggests that at a personal level, an optimistic outlook might correspond with career success (e.g., having a job with high power and prestige, being trusted with responsibilities, deserving a high salary).

Optimism inevitably implies that future outcomes will be better than some alternative outcome such as the present, or an imagined, unfavorable outcome, or the outcomes of others. Of keen interest is the third form of optimism (often called comparative optimism): the belief that one's personal outcome will be more favorable than others' outcomes, which may or may not be tied with the reality (Harris & Middleton, 1994). Evidence suggests that people view displays of comparative optimism (CO), e.g., reporting that one is less likely than others to get injured in car accident or develop heart disease, favorably (Helweg-Larsen, Sadeghian, & Webb, 2002). CO is pervasive and robust (Weinstein, 1980; for a review, see Shepperd, Klein, Waters, & Weinstein, 2013), yet conceptually and empirically distinct from mere positive expectations or dispositional optimism (Radcliffe & Klein, 2002). Moreover, researchers document CO for a variety of outcomes (e. g., getting divorce, having a drinking problem, suffering depression, going bankrupt; Harris, Griffin, & Murray, 2008) and in a variety of populations, particularly in western

cultures (Heine & Lehman, 1995; Joshi & Carter, 2013; Lee & Seligman, 1997; Rose, Endo, Windschilt, & Suls, 2008). We examined the relationship between perceived CO and perceived career success and factors that might account for that relationship.

Of note, we do not examine the relationship career optimism and career success. Career optimism is a dispositional tendency to believe that one will have a positive future career. The items assessing career optimism reflect enthusiasm, confidence and certainty about one's future career and the success of that career (Rottinghaus, Day, & Borgen, 2005). In contrast, we examined observer perceptions of the correspondence between displays of comparative optimism and career success.

CO and Perceptions of Career Success

Several studies demonstrate that CO displayed by a target aligns closely with observer judgments of the target's career success. For example, people rate a target who displays more CO as likely to experience greater career success than a target who displays less CO (Le Barbenchon, Milhabet, Steiner, & Priolo, 2008; Milhabet, Le Barbenchon, Cambon, & Molina, 2015; Milhabet, Le Barbenchon, Molina, Cambon, & Steiner, 2012). Regarding expressions of CO, people who are motivated to convey a favorable image to someone who is evaluating them for a job disclose greater CO than do people who are not so motivated (Le Barbenchon, Milhabet, & Bry, 2016).

How do we account for the relationship between CO (whether perceived or expressed) and perceptions of a target's career success? Evidence suggests that the relationship is not due to greater liking. Specifically, several studies have shown that increases in perceived CO do not correspond with increases in liking (Le Barbenchon et al., 2008; Milhabet et al., 2015). In addition, people who are motivated to present themselves as likeable do not alter their comparative judgments to appear more optimistic (Le Barbenchon, et al., 2016). Indeed, one set of studies found that while greater perceived CO correlated strongly with estimates of career success ($r = .75$), it correlated negatively with estimates of liking ($r = -.48$; Milhabet et al., 2015). Why is perceived CO not linked to greater liking? According to the hubris hypothesis, people

infer that comparative optimists view them disparagingly and predict a relatively unfavorable future for them (Hoorens, Van Damme, Helweg-Larsen, & Sedikides, 2017).

A more likely explanation for the link between perceived CO and perceptions of career success is agency—the ability to control personal actions and outcomes (Jeannerod, 2003). Personal agency is undoubtedly important in achieving career success, and appears linked to expressions of CO. For example, numerous studies have shown that people express greater CO for controllable outcomes, where agency is typically high, than for uncontrollable outcomes, where agency is typically low (Harris, 1996; Klein & Helweg-Larsen, 2002). In addition, research shows that agency traits influence judgments of career success (Carrier, Louvet, Chauvin, & Rohmer, 2014; Louvet, Cambon, Milhabet, & Rohmer, 2018; Mollaret & Miraucourt, 2016). Most relevant is a study demonstrating that research participants rated a person who expressed high (versus moderate or low) CO as more likely to have a successful career and as more agentic (Milhabet et al., 2015).

Importantly, the findings from several studies argue against a unidirectional causal chain from perceived CO to agency to perceived career success. Specifically, studies reveal that information about career success can influence judgments of agency (Cambon, 2006; Carrier, et al., 2014; Christopher & Schlenker, 2004; Dittmar & Pepper, 1994; Louvet, et al., 2018; Oldmeadow & Fiske, 2007). These latter studies raise the possibility of a bi-directional effect (Shepperd, Pogge, & Howell, 2017) whereby both CO and career success influence each other through agency. This bidirectional effect may occur because people often lack well-developed causal theories that link traits and others characteristics (such as CO, agency, and career success). Instead, they likely perceive constructs as clustered because they often co-occur in stories and literature such as “The Little Engine that Could” (Plotnick, 2012). Research in person perception shows that people possess implicit theories of personality in which they perceive certain characteristics or traits as occurring together. When they learn that a person has one trait, they often spontaneously infer the presence of other traits (Uleman & Kressel, 2013). For example, knowing that a person is comparatively optimistic or that a person has a successful career can

elicit a psychologically meaningful portrait of the person, which includes the trait of agency (Rosenberg, Nelson, & Vivekananthan, 1968). Once activated, the trait of agency can evoke inferences such that a person who displays CO also has a successful career, or conversely, that a person who has a successful career is also high in CO.

Overview and Hypotheses

We examined the link between perceived CO and perceived career success in two studies. In Study 1 we manipulated the level of CO revealed by a target and assessed perceptions of career success. Study 1 used a between-subjects design whereas prior studies used within-subjects designs, which can produce contamination effects (Le Barbenchon et al., 2008; Milhabet et al., 2012). Study 2 was the first attempt to manipulate the career success of a target to observe its impact on perceptions of CO. In both studies we also assessed the target's likeability so that we could assess whether manipulations of CO and career success influence judgments of likeability.

We predicted that greater manipulated CO would result in greater estimates of career success (Hypothesis 1a), but would not result in greater estimates of likeability (Hypothesis 2a). This latter hypothesis is consistent with the hubris hypothesis (Hoorens, Pandelaere, Oldersma, & Sedikides, 2012), which proposes that overly favorable self-rating in comparative judgments are not evaluated positively and may even be viewed negatively and undermine liking (Hoorens et al., 2017; Van Damme, Deschrijver, Van Geert, & Hoorens, 2017). We also predicted that greater manipulated perceived career success would result in greater estimates of perceived CO (Hypothesis 1b) but would not result in greater perceptions of likeability (Hypothesis 2b).

Some research suggests that, because they are typically more abstract, general measures of constructs, compared with more concrete measures, are more likely to elicit heuristic or stereotypical thinking and are less likely to be constrained by reality (Kozlowski & Kirsch, 1987; Wigboldus, Semin, & Spears, 2000). To examine whether any results we observed were an artifact of these processes, we included concrete measures of perceived career success in both studies. To our knowledge, no prior studies of CO have included such measures. We predicted that the relationship between CO and general career success would replicate for our concrete

measures of perceived career success (Hypothesis 3).

We assessed agency as a potential mediator in both studies. Research suggests that agency has three components: assertiveness, competence, and effort (Abele, Hauke, Peters, Louvet, Szymkow, & Duan, 2016; Carrier et al., 2014; Cohen, Mollaret, & Darnon, 2016; Louvet et al., 2018; Mollaret & Miraucourt, 2016)¹. A more recent study suggests that the assertiveness component of agency corresponded most strongly with perceived career success, followed by competence, then effort (Louvet et al., 2018). These findings led us to predict that assertiveness, more than competence or effort, would mediate the relationship between CO and career success in our two studies (Hypothesis 4).

To provide a rigorous test of our hypotheses, we also examined whether communion mediates the link between CO and career success. Theorists have proposed that communion and agency represent two fundamental components of human existence (Bakan, 1966). Communion reflects a desire to establish close, cooperative relationships with others, and theorists have argued that communion has two components: sociability and morality (Leach, Ellemers, & Barreto, 2007). We predicted that the components of communion would not mediate the relationship between CO and career success (Hypothesis 5).

In our presentation of CO we cite research on unrealistic comparative optimism (UCO), which is the *erroneous* belief in a more favorable future for oneself than for others (Shepperd et al., 2013). Researchers typically infer UCO is at a group level—a group displays UCO if the group members on average estimate a more favorable future for themselves than for the other group members (Harris & Han, 2011). It is impossible with this method to determine whether any given individual group member is unrealistic. For example, some group members who report that they are less likely than others in the group to get diabetes may be accurate. The most that one can conclude is that the group, on average, displays UCO (Shepperd et al., 2013). The same ambiguity confronts observers when they hear another person claim that his or her future will be more favorable than the future of other people. In the absence of other information, observers cannot determine whether the prediction is unrealistic or accurate. To maintain ecological validity

we opted in the present experiments to manipulate CO rather than UCO. That is, in Study 1, we describe a target (Dominique) who displays CO in predictions but do not specify the area of the predictions (i.e., health, professional, interpersonal, athletic, etc.), or whether the predictions are realistic or unrealistic.

Study 1

Method

Participants. Prior research demonstrates a medium ($f = 0.23$) to large ($f = 0.47$) effect size for the relationship between CO, career success, and trait judgments (Milhabet et al., 2012, 2015; Le Barbenchon et al., 2016). We thus made a tradeoff between these two effect sizes and estimated a minimum sample size of 80 participants to detect an effect size of 0.35 with 80% power for a between-factor ANOVA with two repeated measures. To correct for participant attrition and possible overestimation of the effect size, we recruited 110 participants for Study 1. We excluded data from four participants because of excessive incomplete responses. The final sample consisted of 106 participants, ages 17 to 75 years ($M = 29.6$; $SD = 13.15$; females = 71).

Materials and procedure. We recruited participants in public settings (e.g., in front of libraries, primary schools or supermarkets) to participate individually and without compensation in a study described as examining person perceptions. To manipulate target outlook, we randomly assigned participants to read one of five summaries of the questionnaire responses of a person named Dominique (a gender-neutral name in French). The summary described in general terms how the self-ratings of Dominique for positive and negative outcomes compared with the ratings that Dominique made on behalf of an average person. Depending on the condition, the summary indicated that 80% of Dominique's responses were comparatively pessimistic (*high comparative pessimism*), 60% were comparatively pessimistic (*moderate comparative pessimism*), 60% were comparatively optimistic (*moderate comparative optimism*), 80% were comparatively optimistic (*high comparative optimism*), or Dominique's self-ratings were neither more optimistic nor pessimistic than Dominique's ratings of the average person (*neutral condition*; for a similar operationalization, see Parducci, Calfee, Marshall, & Davidson, 1960; Boillaud & Molina, 2015).

Measures. We assessed the effectiveness of the CO manipulation with a single, 7-point item: “Would you say that Dominique is (-3 = *more pessimist for him/herself than for others*; +3 = *more optimist for himself/herself than for others*).” We assessed five potential mediating traits representing agency and communion with 15 items (three for each trait) drawn from previous research (Carrier et al., 2016; Leach et al., 2013; Louvet et al., 2018) and using a 7-point response scale (1 = *not at all*; 7 = *absolutely*). The traits were assertiveness (audacious, enterprising, and self-confident), competence (capable, competent, and intelligent), effort (conscientious, serious, and industrious), morality (right, honest, and respectful), and sociability (pleasant, warm, and outgoing). The coefficient alphas for the five measures were: assertiveness ($\alpha = .98$), competence ($\alpha = .95$), effort ($\alpha = .94$), sociability ($\alpha = .95$), and morality ($\alpha = .95$).

We assessed global career success using two items (“Does this person have everything to succeed professionally?”, and “Does this person have a high status?”), and assessed global likeability using two items (“Does this person have everything to be liked?”, and “Does this person have a lot of friends?”). Participants responded to the four items using a 7-point scale (1 = *not at all*; to 7 = *totally*) and we averaged responses to each set of items to create single indices of career success ($\alpha = .84$) and likeability ($\alpha = .69$).

We assessed career success concretely in two ways. First, participants estimated Dominique’s monthly wage in euros in response to an open-ended item². Second, participants estimated the probability that Dominique worked in each of six occupations (1 = *not probable*; 7 = *very probable*) that varied in pilot-testing in estimated wage. We selected occupations based on three criteria: (a) Participants had a clear representation of the occupation and were in high agreement about the wage of the occupation, (b) the occupations were equivalent in ratings of likeability, and (c) the occupations differed significantly in estimated wage. The selected occupations and their respective wage estimates (1 = *very low wage*; 7 = *very high wage*) were: lawyer (6.24), veterinary (5.36), teacher (4.27), steward/stewardess (3.06), postman (2.34), barman (1.65). For each occupation, we multiplied a participant’s probability rating by the estimated wage. We then computed the average of the six products for each participant to arrive

at a score for occupational prestige. The higher the score, the more participants estimated that Dominique had a highly paid occupation.³

Results

Preliminary analyses. Table 1 presents the correlations between all variables and reveals that our various measures of career success correlated positively and significantly with each other and with assertiveness. We also found that effort correlated with the global measure of career success and the likeability correlated with our concrete occupational prestige.

[Table 1 near here]

The manipulation of future outlook was quite successful. A one-way ANOVA of the CO manipulation check item revealed a main effect of outlook, $F(4, 100) = 49.38, p < .001, \eta_p^2 = .66$. Planned contrasts showed that, except for the difference between the pessimistic and the neutral target, participants differed significantly in their CO ratings across the five conditions (see Table 2). Moreover, these five means were clearly organized in a linear fashion, $F(1, 100) = 192.25, p < .001$.

[Table 2 near here]

An exploratory factor analysis with oblimin rotation of the 15 agency and communion items confirmed a five-factor solution, with the items loading as expected within factors (see appendix A1).

We tested the effect of our CO manipulation on our outcomes using ANOVA followed by planned contrasts. We tested four contrasts: a linear contrast (highly pessimist coded -2, pessimist coded -1, neutral coded 0, optimist coded +1, and, highly optimist coded +2), a quadratic contrast (2, -1, -2, -1, 2), a cubic contrast (-1, 2, 0, -2, 1), and a quartic one (1, -4, 6, -4, 1). Hypotheses 1a, 1b, and 3 entailed linear contrasts. However, we tested the quadratic, cubic, and quartic contrasts for a full exploration of the results. The means and standard deviations for all variables appear in Table 2.

Expressed career success & likeability. Consistent with past research and Hypothesis 1a, the greater CO displayed by Dominique, the more participants estimated that Dominique had a

successful career. Consistent with Hypothesis 2a, greater displays of CO did not correspond with greater likeability ratings of Dominique. To test these hypotheses statistically, we submitted the global evaluative scores to a 5 (future outlook) \times 2 (global evaluative scores: likeability, career success) ANOVA with future outlook treated as between-participants variable and global evaluation score treated as within-participants variable. Analysis revealed a main effect of target outlook, $F(4, 101) = 6.01, p < .01, \eta_p^2 = .19$, qualified by a target \times global evaluation interaction, $F(4, 101) = 13.01, p < .001, \eta_p^2 = .34$. The orthogonal contrasts analysis revealed a significant linear effect, $F(1, 101) = 53.37, p < .001, \eta^2 = 0.40$, and a significant quadratic effect, $F(1, 101) = 10.91, p < .001, \eta^2 = 0.09$, for career success scores. However, the magnitude of effect was smaller for the quadratic than the linear effect, $z = 2.39, p < .02$. For likeability scores, the analysis only showed a quadratic effect, $F(1, 101) = 7.21, p < .01, \eta^2 = 0.06$ due to only one significant difference between strong comparative pessimism and neutral outlook.

Occupational prestige and wage scores. Consistent with Hypothesis 3, as Dominique's displays moved from comparative pessimism to comparative optimism, more participants rated Dominique's occupation as prestigious and Dominique's starting wage as high. Importantly, as evident in Table 2, it remains unclear whether the effect for occupational prestige emerged largely because participants rated Dominique as having a less prestigious occupation when Dominique displayed comparative pessimism or because they rated Dominique as having a more prestigious occupation when displaying comparative optimism. Statistical analyses using a one-way ANOVA to analyze occupational prestige score revealed a significant effect of future outlook condition, $F(4, 101) = 5.59, p < .001, \eta^2 = 0.18$. Orthogonal contrasts revealed that only the linear effect was statistically significant, $F(1, 101) = 21.64, p < .001, \eta^2 = 0.18$.

Because wage estimates were positively skewed, Shapiro-Wilks statistic = .88, $df = 106, p < .001$, we log-transformed them. However, the results on the non-transformed and on the log-transformed yielded to the same results. We report the non-transformed estimates in Table 2 to facilitate understanding. The analysis revealed a significant effect of the outlook on wage estimates, $F(4, 101) = 19.70, p < .001, \eta^2 = 0.43$. Planned contrasts revealed that only the linear

effect, $F(1, 101) = 61.06, p < .001, \eta^2 = 0.37$, and quadratic effect, $F(1, 101) = 15.21, p < .001, \eta^2 = 0.13$, were statistically significant. The means for estimated wage revealed a linear trend, although the means at the lower end of the scale did not differ from each other.

Potential mediating traits. As expected, the means for assertiveness in Table 2 revealed that the more Dominique displayed CO, the more assertive participants judged Dominique. Analysis revealed a similar linear effect for competence, but revealed no linear effects for any of the other traits (effort, morality, and sociability). Although not a direct test of our mediation hypothesis, these findings are nevertheless consistent with Hypotheses 4 and 5. To test these effects statistically, we submitted the trait judgments to a 5 (future outlook) \times 5 (Mediation trait: assertiveness, competence, effort, sociability, morality) ANOVA with future outlook treated as between-participants variable and mediation trait treated as within-participants variable. Analysis revealed main effects of future outlook, $F(4, 101) = 5.76, p < .001, \eta_p^2 = .18$, and trait judgment, $F(4, 404) = 4.99, p < .001, \eta_p^2 = .04$, qualified by a future outlook \times trait judgment interaction, $F(16, 404) = 5.14, p < .001, \eta_p^2 = .17$. We probed the interaction by conducting contrast analyses on each of the trait judgments. None of the effects was significant for morality, $F(1, 101) = 1.45, p = .23, \eta_p^2 = .01$, sociability, $F(1, 101) = 1.80, p = .18, \eta_p^2 = .01$, or effort, $F(1, 101) < 1, \eta_p^2 = .001$. The linear effect was statistically significant for competence, $F(1, 101) = 14.33, p = .04, \eta_p^2 = .04$, and assertiveness, $F(1, 101) = 68.82, p < .001, \eta_p^2 = .40$. A comparison of the linear effect sizes for competence and assertiveness revealed that the latter was significantly stronger than the former, $z = 2.75, p = .009$. Finally, only the quadratic effect for assertiveness was statistically significant, $F(1, 101) = 12.41, p < .001, \eta_p^2 = .11$. However, the magnitude of effect was smaller for the quadratic effects than for the linear effect, $z = 2.24, p < .031$.

Mediation. We created a composite measure of perceived career success for each participant based on the average of the standardized scores from career success, wage, and occupational prestige. We conducted a parallel multiple mediation model to test the causal path from estimated CO to perceived career success. We entered perceived career success as the dependent variable, estimated CO of the target as independent variable, and simultaneously tested

our five trait judgments as parallel mediators, thus allowing the investigation of the indirect effect of each possible mediator while controlling for the effect of the other potential mediators. We applied the bootstrapping method with 10,000 bootstraps using Hayes' (2013) PROCESS macro for SPSS (version 2.16; model 4).

Analysis revealed that the mediational model was statistically significant, $R = .71$, $R^2 = .50$, $F(6, 98) = 16.52$, $p < .001$. Consistent with Hypotheses 4 and 5, only assertiveness mediated the relationship between CO and perceived career success. As evident in Table 3, the significant effect of CO on perceived career success (path c), became marginally significant ($p = .07$) when we entered the mediators into the model (path c'). Among the potential mediators, only assertiveness did not include zero in the confidence interval and thus emerged as a significant mediator between CO and perceived career success.

[Table 3 near here]

Repeating the mediation analysis on each of the individual measures of perceived career success replicated the results of the mediation based on the composite score with only minor variations. Likewise, repeating the analyses after replacing perceived CO with the contrast codes representing the five experimental conditions yielded the same results. Finally, we repeated the analyses after substituting likeability for career success as the outcome to test for divergent validity. Assertiveness was the only mediator linked to CO, morality and sociability were the only mediators linked to likeability, and none of the indirect effect involving the mediating variables was statistically significant (all confidence intervals included 0).

Discussion

Study 1 provided strong support for our hypotheses. Greater manipulated CO resulted in greater estimates of career success (Hypothesis 1a), but not greater liking of the target (Hypothesis 2a). Moreover, this effect replicated for concrete measures of career success—occupational prestige and estimated monthly wage (Hypothesis 3). Finally, we found that only assertiveness mediated the relationship between CO and perceptions of career success (Hypothesis 4). Other measures of agency (competence and effort) or measures of communion

(sociability and morality) did not mediate the relationship (Hypothesis 5). Collectively, these findings support the first half of the bidirectional model we proposed.

Study 1 advances prior research in several ways. First, prior studies that have examined the effects of CO on evaluations of targets relevant to liking and perceived career success used within-subjects designs, which can produce contamination effects (Le Barbenchon et al., 2008; Milhabet et al., 2012), whereas the present studies used entirely a between-subjects design. Second, we examined specific measures of career success (i.e., estimated wages and occupational prestige) in addition to more a more general measure of global career success. Third, we examined whether agency versus communion mediated the proposed effects.

Study 2 tested the second half of the model—the path from career success through agency to perceptions of CO. Study 2 is unique in that it is the first to examine whether variations in a target's career success influences inferences about the person's level of perceived comparative optimism and whether agency versus communion mediated the proposed effects. This second study also used concrete measures of perceived career success.

Study 2

Method

Participants. As in Study 1, we calculated a minimum sample size of 63 participants to detect an effect size of 0.35 with 80% power (Milhabet et al., 2012, 2015; Le Barbenchon et al., 2016). We sought to recruit 100 participants (again, recruited in public settings) to correct for participant attrition and possible overestimation of the effect size. Because of difficulty recruiting participants without compensation, the final sample consisted of 89 participants ages 18 to 75 years ($M_{age} = 36.42$; $SD = 14.78$, 50 women).

Procedure. We ran participants individually in a study described as examining impression formation and randomly assigned them to one of three career success conditions. We showed participants a picture of an office and asked them to imagine the kind of person who worked there. To manipulate career success, we varied the prestige of the office to illustrate low, intermediate, or high career success. To ensure that judgments were not dependent on a specific

image, we used two sets of equivalent office images for each level of career success. We extensively piloted the office images to make sure that the images within condition were similar in the estimated career success of the presumed occupant (ratings could range from 1 = *low career success* to 7 = *high career success*), yet differed from the other conditions: low career success ($M_{\text{set1}} = 3.43$, $SD_{\text{set1}} = .43$; $M_{\text{set2}} = 2.33$, $SD_{\text{set2}} = .05$), intermediate career success ($M_{\text{set1}} = 4.55$, $SD_{\text{set1}} = .21$; $M_{\text{set2}} = 4.27$, $SD_{\text{set2}} = .05$), and high career success ($M_{\text{set1}} = 5.56$, $SD_{\text{set1}} = .15$; $M_{\text{set2}} = 5.67$, $SD_{\text{set2}} = .21$). Next, participants completed our measures then we debriefed and thanked them.

Measures. We used the same items from Study 1 to assess the five potential mediating traits (presented in a fixed, random order: for assertiveness, $\alpha = .90$; for competence, $\alpha = .89$; for effort, $\alpha = .87$; for sociability, $\alpha = .85$; and for morality, $\alpha = .85$), global career success, likeability (presented in a fixed, random order: for career success, $\alpha = .77$; for likeability, $\alpha = .83$), and estimated monthly wage. We omitted the measure of occupational status because several of the occupations did not match the setting depicted in the images. We assessed target CO using a single item asking participants to estimate the target's level of comparative optimism: "Do you think that Dominique is (1 = *more pessimistic for himself/herself than for others*; 7 = *more optimistic for himself/herself than for others*)." Finally, participants reported their age, sex, occupation and wage. None of these demographic variables moderated the results, and thus we do not discuss them further.

Results

Manipulation checks and preliminary analyses. Table 4 presents the correlations between all variables in Study 2 and reveals that estimates of CO correlated strongly with wage estimates and assertiveness, but weakly at best with the other variables we measured. The manipulation of career success was quite successful. A one-way ANOVA of the estimated monthly wage item (after log-transforming the data to correct for a positive skew) revealed a significant effect of experimental condition, $F(2, 86) = 51.58$, $p < .001$, $\eta_p^2 = .54$.

[Table 4 near here]

As evident in Table 5, the estimated wage (presented non-log-transformed for ease of interpretation) was lowest in the low career success condition, followed by the intermediate and high career success conditions (all means differed at $p < .001$).

[Table 5 near here]

An exploratory factor analysis with oblimin rotation of the 15 agency and communion items yielded a four-factor solution (see Appendix A2). The items assessing effort and competence emerged as a single factor. Nevertheless, to make the analyses of Study 2 comparable with those in Study 1, we treated effort and competence as distinct.

Preliminary analysis revealed no effects involving the two sets of images. Thus, we collapsed across images within career success conditions. We tested the effect of the career success manipulation using ANOVA followed by planned contrasts. We tested two contrasts: a linear contrast (low career success coded -1, intermediate career success coded 0, and high career success coded +1), and a quadratic contrast (+1, -2, +1).

Perceived target CO, likeability and career success. The mean responses to all items appear in Table 5. Consistent with Hypothesis 1b, greater manipulated career success corresponded with rating the target higher in CO. Statistical analyses using a one-way ANOVA of participants' estimates of the target's level of CO yielded a significant effect of career success condition, $F(2, 86) = 6.91, p < .005, \eta_p^2 = .14$. Follow-up probing revealed a statistically significant linear effect, $F(1, 86) = 13.79, p < .001, \eta_p^2 = .14$, and no quadratic effect, $F < 1$. Although the linear effect was statistically significant, paired comparisons revealed that the difference between estimates CO in the intermediate and high career success conditions was marginally statistically significant.

Consistent with Hypothesis 2b, career success condition had no effects on ratings of the target's likeability. Specifically, a 3 (target career success: low, intermediate, high) \times 2 (global evaluation of career: success, likeability) ANOVA with career success treated as between-participants measure and global evaluation treated as a within-participants variable, yielded main effects of targets' career success, $F(2, 86) = 5.01, p = .008, \eta_p^2 = .10$, and global evaluation, $F(1,$

86) = 37.52, $p < .001$, $\eta_p^2 = .30$, qualified by a significant target career success \times global evaluation interaction, $F(2, 86) = 5.43$, $p = .006$, $\eta_p^2 = .11$. As predicted, probing of the interaction revealed no difference across conditions in ratings of target likeability. However, estimates of the target's career success were highest in the high career success condition, followed by intermediate career success condition, and finally the low career success condition even if the first two means only differed at $p < .10$. The effect for career success again demonstrates the success of the manipulation.

Potential mediating traits. Greater manipulated career success corresponded with greater ratings of assertiveness. We observed a similar pattern for sociability, effort and competence, but the effects were notably smaller and the difference between experimental conditions for these other traits was often not statistically significant.

We tested statistically the effect of career success condition on participants' five trait ratings in a 3 (target career success) \times 5 (trait) ANOVA with target career success treated as a between-participants variable and trait treated as within-participants variable. Analysis revealed main effects of target career success, $F(2, 86) = 13.92$, $p < .001$, $\eta_p^2 = .24$, and trait, $F(4, 344) = 17.66$, $p < .001$, $\eta_p^2 = .17$. These main effects were qualified by a significant interaction, indicating differences in the pattern of means across traits, $F(8, 344) = 7.70$, $p < .001$, $\eta_p^2 = .15$. Tests of the linear effect revealed no effect for morality, $F < 1$, $\eta_p^2 = .006$, a small effect for sociability, $F(1, 86) = 5.90$, $p < .01$, $\eta_p^2 = .06$, moderate effects for effort, $F(1, 86) = 14.37$, $p < .001$, $\eta_p^2 = .14$, and competence, $F(1, 86) = 13.02$, $p < .001$, $\eta_p^2 = .13$, and a large effect for assertiveness, $F(1, 86) = 86.75$, $p < .001$, $\eta_p^2 = .50$. The effect-size for assertiveness was significantly larger than the effect-sizes for the other traits, all $z_s > 2.76$, $ps < .008$. None of the quadratic effects was statistically significant, $ps > .31$.

Mediation. We conducted a parallel multiple mediation model to test the path from career success to estimates of CO. We entered perceived career success as the predictor, perceptions of CO as the outcome, and the five trait measures simultaneously as parallel mediators. We applied the bootstrapping method with 10,000 bootstraps using Hayes' (2013) PROCESS macro for

SPSS (version 2.16; model 4).

Analysis revealed that the mediational model was statistically significant, $R = .57$, $R^2 = .33$, $F(6, 82) = 6.83$, $p < .001$. Consistent with Hypotheses 4 and 5, only assertiveness was a statistically significant mediator. Specifically, as evident in Table 6, the direct effect of the career success condition on estimates of CO prior to entry of the mediators (path c) was still statistically significant but greatly reduced. Finally, we observed a statistically significant path from the mediator to estimates of CO only for assertiveness. Repeating the mediation analysis after replacing perceived career success with the contrast codes representing the three experimental conditions yielded same results.

[Table 6 near here]

Discussion

Like Study 1, Study 2 provided strong support for our hypotheses. Greater manipulated career success resulted in greater estimates of CO (Hypothesis 1b), but not greater liking of the target (Hypothesis 2b). In addition, we once again found that only assertiveness mediated the relationship between career success and estimates of CO (Hypothesis 4). Other measures of agency (competence and effort) or measures of communion (sociability and morality) did not mediate the relationship (Hypothesis 5). These findings support the second half of the bidirectional model we proposed.

General Discussion

Past studies have observed a relationship between displays of CO by a target and judgments of a target's likely career success. We proposed that inferences of assertiveness, a type of agency, account for the relationship. We further proposed that the relationship is likely bidirectional. Both information about a target's level of CO (which we operationalized from quite pessimistic to quite optimistic) and a target's career success activate perceptions of the assertiveness component of agency, and this component in turn elicits corresponding judgments about the target's career success and the target's level of CO. This bidirectional influence presumably arises from people's implicit theories about how characteristics and traits cluster

together. Learning that a person is high (or low) on one trait leads to the inference that the person is also high (or low) on other traits (Uleman & Kressel, 2013).

The findings from our studies support for this bidirectional model. In Study 1, participants were more likely to conclude that a target had a successful career if the target displayed comparative optimism than if the target displayed comparative pessimism. In Study 2, participants were more likely to conclude that a target was comparatively optimistic if the target appeared to have a successful career than if the target did not. In both studies, the agency trait of assertiveness mediated the effect, whereas other possible contenders (the agency traits of competence or effort, the communal traits of morality and sociability) did not. In addition, the effect replicated when we substituted specific measures of career success (occupational prestige and estimated wage) for the more general measure. Finally, the manipulations of CO and career success had little or no effect on ratings of target likeability, suggesting that displaying CO (or appearing to have a successful career) has limited benefits. At first blush, this latter finding seems inconsistent with a study that found greater rejection of a target who displayed comparative pessimism (versus comparative optimism), an effect that resulted from inferring that the pessimistic target was also depressed (Helweg-Larsen et al., 2002). We suspect, however, that these research participants, if asked, would also have rated the target as less likely to have a successful career.

The lack of effect of CO on likeability ratings also seems inconsistent with research on the hubris hypothesis, which predicts that people dislike others who are arrogant or excessively confident. However, expressions of CO are qualitatively different from expressions of hubris in that they may or may not reflect arrogance. Participants may have inferred that target was making realistic predictions about the future. It may also be the case, as suggested by Hoorens (2017), that CO elicits dislike only to the extent that observers believe the comparative optimist is making a downward comparison with them. Participants in our study were unlikely to draw such an inference because they were making ratings about a target that they had never met and presumably would never meet. Finally, our finding that a target's expressions of CO (versus

comparative pessimism) did not influence observers' liking of the target is consistent with research using a CO paradigm to examine hubris (Hoorens et al., 2017).

Limitations & Strengths

Our research had several limitations. First, we used convenience sample and our findings may not generalize to other sample. Importantly, several aspects of our studies increase our confidence in the results. First, the effect of CO on career success replicated findings from past studies (Le Barbenchon et al., 2008; Milhabet et al., 2015; Milhabet et al., 2012) and replicated when we used different outcome measures. Second, the effects we observed were quite large, with $\eta^2 > 0.10$ and up to .40. Third, the effects remained even when we subjected them to alternative tests such as tests for non-linear effects.

Second, we tested mediation using a measurement-of-mediation strategy, in which the mediator is measured rather than manipulated, thereby opening our findings to alternative interpretations of the causal path (Bullock, Green, & Ha, 2010; Kline, 2015). Although the measurement-of-mediation strategy maximized our ability to find an effect by employing a simple experimental design and an easy, straight-forward analysis strategy, needed is a test of our model using a testing-process-by-interaction strategy (Judd, Yzerbyt, & Muller, 2014), in which investigators manipulate both the independent and the mediating variable. However, it is noteworthy that the mediation analyses were consistent and produced large effects in both studies. Finally, we followed the best practices to establish mediation, such as ensuring that the mediator occurs temporally after the predictor yet prior to the outcome, testing mediators that have strong theoretical and empirical grounding, and testing multiple possible mediators.

Third, our studies assessed perceptions and judgments regarding the relationship between CO, career success, and agency. Lacking was an assessment of whether these perceptions and judgments are evident in behavior. Fourth, our manipulation of CO in Study 1 excluded the dimensions on which Dominique displayed unrealistic optimism. It is possible that participants assumed from the outcome items involving wage and career prestige that Dominique's CO pertained exclusively to career success. While possible, we view it unlikely because the questions

that followed the CO manipulation included items that were non-career related including questions assessing morality and sociability. Moreover, other studies have directly manipulated CO with estimates of professional and friendship related outcomes (Milhabet et al., 2012) and with estimates of non-professional outcomes (e.g., romantic happiness, and family life; Hoorens et al., 2017). In these studies, the CO manipulation affected responses to measures of career success (Milhabet et al., 2012) and competence (Hoorens et al., 2017). Nevertheless, these studies deserve replication with a manipulation (Study 1) and measure (Study 2) of CO that specifically includes non-career related outcomes. Importantly, this possibility does not negate our central argument that people have implicit theories that certain characteristics, such as CO and career success, covary. In addition, this possibility does not negate the finding that agency (and not communion) mediates the bidirectional relationship between CO and career success.

These limitations aside, the approach we took to examining CO has an important strength that prior researchers who have used it have overlooked. Researchers in the field have recently lamented the challenges associated with the traditional approach to examining perceived CO and thus the paucity of studies from which meaningful consequences can be inferred (Shepperd et al., 2017). With the traditional approach (which we call the *actor* approach), the researchers examine whether people (actors) who vary in CO differ in their intentions, behaviors, or outcomes. The actor approach is problematic most notably because it measures rather than manipulates CO, making it almost impossible to determine whether CO is a cause or consequence of important outcomes (Shepperd et al., 2017). In our research, we borrowed an approach first used to assess CO in 2002 (Helweg-Larsen et al., 2002) that we call the *observer* approach. With the observer approach, researchers examine how an audience of people (observers) responds to targets that vary in their reports of CO. Because researchers can manipulate the target's level of CO, the observer approach does not suffer the problem of causal ambiguity inherent in the actor approach. Put simply, with the observer approach, research can easily examine the downstream consequences of CO.

Beyond the ability to examine consequences, the observer approach also introduces an

entirely new set of potential consequences of CO that researchers might explore. For example, our findings suggest that people may be more inclined to hire, choose as a working partner, or promote others who display higher (compared with lower) CO because they perceive them as more agentic and more likely to be successful. Similarly, investors may be more likely to select an investment advisor who is high in CO precisely because they perceive the advisor as being more agentic and ultimately as more likely to be successful. More broadly, retailers may be more likely to hire salespeople who are high in CO, again because of their presumed greater agency and prospects for career success. Finally, we noted earlier that people do not always view displays of CO favorably. Other researchers using the observer approach to test the hubris hypothesis find that observers rate others who display high CO (compared with displays of high absolute optimism) as less warm and report less interest in affiliating with them (Hoorens et al., 2017). Presumably, these ratings translate into different behaviors directed toward people who display high versus low CO. The observer approach to examining CO introduces a means to successfully examining the consequences of CO and we challenge researchers to use this approach for this purpose.

Closing Remarks

Research on the hubris hypothesis suggests that reports of CO (compared with reports of absolute optimism) can elicit less favorable evaluations from observers in terms of warmth (Hoorens et al., 2017). Our research suggests that such claims nevertheless elicit favorable evaluations. Observers judge others who displayed higher (compared with lower) CO as more likely to have successful careers apparently because they perceive comparative optimists as having greater agency, which plays a mediating role in the bidirectional link between CO and judgments of career success. To the extent that these evaluations affect behavior, they can have important downstream consequences. The nature of these downstream consequences represents an exciting direction for future research.

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Table 1

Means, Standard Deviations, and Inter-correlations in Study 1 (N = 106)

	Means	SD	Occup. Prestige	Wage	Assert- iveness	Compe- tence	Effort	Like- ability	Moral- ity	Socia- bility
Career Success	3.52	1.71	.44****	.71****	.63****	.06	.27***	.12	-.04	.13
Occup. Prestige	3.59	1.03		.38****	.26**	-.08	.01	.37****	.23*	.16
Wage	1,954€	857€			.63****	.01	.15	.07	-.01	.11
Assertiveness	3.56	2.03				.18	.12	-.01	-.11	-.04
Competence	3.91	1.57					-.06	-.16	-.12	-.10
Effort	4.11	1.46						-.02	.01	.08
Likeability	3.54	1.43							.25**	.14
Morality	4.2	1.50								.16
Sociability	3.44	1.59								

Note. * $p < .05$, ** $p < .01$, *** $p < .005$, **** $p < .001$

Table 2

Means (standard deviations) for Study 1

	Target Level of Comparative Optimism/Pessimism				
	Strong Comparative Pessimism <i>n</i> = 20	Moderate Comparative Pessimism <i>n</i> = 22	Neutral <i>n</i> = 22	Moderate Comparative Optimism <i>n</i> = 21	Strong Comparative Optimism <i>n</i> = 20
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
Comparative optimism	-2.01 ^a (.27)	-0.77 ^b (.25)	-0.22 (.25) ^b	1.71 ^c (.26)	2.65 ^d (.16)
Career success	2.65 ^a (.21)	2.85 ^a (.20)	3.43 ^b (.21)	3.73 ^b (.21)	4.71 ^c (.21)
Likeability	3.05 ^a (.30)	3.60 ^{ab} (.28)	4.14 ^b (.28)	3.77 ^{ab} (.29)	3.63 ^{ab} (.30)
Occup. prestige	3.03 ^a (.21)	3.18 ^{ab} (.19)	3.62 ^{bc†} (.20)	3.96 ^c (.20)	4.19 ^{c†} (.21)
Estimated wage	1,657€ ^a (148)	1,414€ ^a (138)	1,632€ ^a (141)	2,185€ ^b (144)	2,980€ ^c (148)
Assertiveness	2.67 ^a (.33)	2.06 ^a (.31)	2.84 ^a (.32)	4.71 ^b (.33)	5.75 ^c (.33)
Competence	3.57 ^a (.34)	3.72 ^{ab} (.32)	3.77 ^{ab} (.33)	3.85 ^{ab} (.33)	4.64 ^b (.34)
Effort	4.06 ^a (.33)	4.17 ^a (.31)	4.08 ^a (.31)	3.92 ^a (.32)	4.31 ^a (.33)
Morality	4.21 ^a (.33)	4.36 ^a (.31)	4.54 ^a (.32)	4.14 ^a (.32)	3.69 ^a (.33)
Sociability	2.61 ^a (.35)	3.74 ^b (.32)	3.77 ^b (.33)	3.46 ^{ab} (.34)	3.41 ^{ab} (.34)

Note. Within rows, means with different superscripts differ significantly at $p < .05$, † $p < .06$.

Table 3

Summary of multiple mediator model analysis (Study 1) of the relations between comparative optimism (predictor) and financial success (outcome)

Effects	Path	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% <i>CI</i>
Direct effect without mediators	c	.23	.04	5.43	.0001	[.146, .314]
Direct effect with mediators	c'	.07	.04	1.82	.07	[-.006, .164]
Assertiveness	a	.52	.08	6.37	.0001	[.363, .691]
	b	.19	.03	5.67	.0001	[.128, .266]
	ab	.13	.03			[.075, .216]
Competence	a	.14	.07	1.92	.05	[-.004, .290]
	b	-.05	.03	-1.45	.15	[-.132, .020]
	ab	-.008	.007			[-.031, .008]
Effort	a	.07	.06	1.09	.27	[-.061, .213]
	b	.04	.04	1.12	.26	[-.035, .127]
	ab	.003	.005			[-.002, .022]
Morality	a	-.05	.07	-0.81	.41	[-.198, .049]
	b	.069	.04	1.72	.08	[-.010, .149]
	ab	-.004	.004			[-.023, .003]
Sociability	a	.11	.07	1.45	.15	[-.040, .260]
	b	.05	.03	1.41	.16	[-.022, .130]
	ab	.006	.007			[-.001, .027]

Note. c = the total effect from the predictor (CO) to the outcome (career success), c' = the direct effect after controlling for the five mediators, a = the effect of the predictor on the mediator, b = the effect of the mediator on the outcome, and ab = the mediation effect.

Table 4

Means, Standard Deviations, and Inter-correlations in Study 2 (N = 89)

	Means	SD	Career Success	Wage	Assert- iveness	Compe- tence	Effort	Like- ability	Moral- ity	Socia- bility
Compar. Optim.	4.27	1.44	.53****	.42****	.51****	.30**	.27**	.06	.22*	.18
Career Success	4.63	1.44		.58****	.65****	.66****	.63****	.40****	.45****	.37****
Wage	3,349€	2,658€			.64****	.48****	.41****	.14	.13	.08
Assertiveness	4.34	1.68				.48****	.54****	.09	.27**	.23*
Competence	4.77	1.42					.78****	.49****	.52****	.54****
Effort	4.98	1.30						.37****	.44****	.42****
Likeability	3.63	1.54							.39****	.50****
Morality	4.46	1.30								.52****
Sociability	3.83	1.47								

Note. * $p < .05$, ** $p < .01$, $p < .005$, **** $p < .001$

Table 5

Means (standard deviations) for Study 2

	Level of Professional Success		
	Low	Intermediate	High
Estimated wage	1,635€ ^a (360)	2,583€ ^b (366)	5,803€ ^c (360)
Comparative optimism	3.60 ^a (.24)	4.31 ^b (.25)	4.90 ^{c†} (.24)
Career success	3.83 ^a (.24)	4.75 ^b (.24)	5.31 ^{c†} (.24)
Likeability	3.58 ^a (.28)	3.27 ^a (.28)	4.01 ^a (.28)
Assertiveness	2.81 ^a (.21)	4.52 ^b (.22)	5.68 ^c (.21)
Competence	4.18 ^a (.24)	4.67 ^a (.24)	5.43 ^b (.24)
Effort	4.30 ^a (.22)	5.16 ^b (.22)	5.48 ^b (.22)
Morality	4.35 ^a (.23)	4.41 ^a (.24)	4.61 ^a (.23)
Sociability	3.27 ^a (.26)	4.04 ^{ab} (.26)	4.18 ^b (.26)

Note. Within rows, means with different superscripts differ significantly at $p < .05$, † $p < .10$.

Table 6

Mediation analysis for Study 2 of the relations between financial success (predictor) and comparative optimism (outcome)

Effects	Path	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% <i>CI</i>
Direct effect without mediators	c	.86	.14	5.89	.001	[.573, 1.158]
Direct effect with mediators	c'	.66	.24	2.70	.008	[.174, 1.152]
Assertiveness	a	1.36	.14	9.77	.001	[1.088, 1.643]
	b	.23	.11	2.04	.044	[.006, .468]
	ab	.32	.18			[.007, .749]
Competence	a	1.02	.13	7.84	.001	[.765, 1.284]
	b	-.09	.17	-0.51	.61	[-.443, .262]
	ab	-.09	.19			[-.514, .272]
Effort	a	.85	.12	6.73	.001	[.603, 1.108]
	b	-.11	.16	-0.66	.51	[-.445, .223]
	ab	-.09	.20			[-.486, .309]
Morality	a	.48	.14	3.27	.001	[.189, .775]
	b	.07	.12	0.63	.52	[-.169, .326]
	ab	.03	.07			[-.081, .218]
Sociability	a	.42	.17	2.46	.01	[.0827, .764]
	b	.06	.11	0.59	.55	[-.156, .289]
	ab	.02	.06			[-.069, .179]

Note. c = the direct effect from the predictor (financial success) to the outcome (CO), c' = the direct effect after controlling for the five mediators, a = the effect of the predictor on the mediator, b = the effect of the mediator on the outcome, and ab = the mediation effect.

Appendix

Table A1. *Factor loadings in Study 1*

	Factor				
	1	2	3	4	5
pleasant	-0.00863	-0.02624	-0.02114	0.04232	0.81474
warm	0.00664	-0.00385	-0.13030	0.07816	0.48125
outgoing	0.01683	0.05167	0.03282	-0.06255	0.71910
righteous	-0.01701	0.45654	0.04883	-0.28725	0.13503
honest	-0.06853	0.41855	-0.07196	0.11621	0.00771
respectful	-0.00628	1.26557	-0.00660	0.01384	-0.00378
serious	0.11743	0.04915	-0.08838	0.65963	0.02403
industrious	-0.08179	-0.12002	-0.03228	0.67811	-0.00383
conscientious	0.00980	0.08403	0.09678	0.79803	0.01024
capable	0.34019	0.04839	0.43621	-0.09683	0.01652
competent	-0.08842	-0.10516	0.51094	0.01734	0.11079
intelligent	-0.00477	-0.00361	1.08854	0.01409	-0.02320
Self confident	0.89723	-0.03301	0.00948	0.01365	0.05712
audacious	0.77593	0.05177	-0.02646	0.00771	-0.14665
enterprising	0.74228	-0.05552	0.00111	0.00649	0.06463
% of Variance	14.18	13.61	11.37	11.01	9.85
Cumulative %	14.18	27.79	39.16	50.17	60.02

Note. Principal axis factoring extraction used in combination with an ‘oblimin’ rotation

Table A2. *Factor loadings in Study 2*

	Factor			
	1	2	3	4
pleasant	0.02995	0.0663	0.7898	-0.0134
warm	-0.00972	0.0158	0.8369	-0.0002
outgoing	0.04376	-0.0148	0.7395	0.0739
respectful	0.17898	-0.0245	0.1930	0.6325
righteous	0.12473	0.1909	-0.1061	0.7392
honest	-0.08498	-0.0702	0.0464	0.9176
conscientious	0.69461	0.1433	-0.0819	0.0805
industrious	0.78671	0.1372	-0.0362	-0.0489
serious	0.94405	-0.0747	-0.0415	-0.0549
capable	0.76738	0.0540	0.0965	0.0377
competent	0.83239	-0.0414	0.0927	0.0286
intelligent	0.66869	-0.0531	0.0996	0.1300
Self-confident	0.02878	0.8674	-0.0534	0.0128
entreprising	-0.02741	0.9371	0.0177	0.0293
audacious	0.04563	0.7868	0.1227	-0.0511
% of Variance	27.01	16.54	14.32	13.41
Cumulative %	27.01	43.55	57.87	71.28

Note. Principal axis factoring extraction used in combination with an ‘oblimin’ rotation

Notes

¹ Prior research finds that a confirmatory factor analyses of agency yields three factors (assertiveness, competence, and effort), and that separating agency into three factors produces more interesting results than aggregating the three factors (Cohen, Mollaret, & Darnon, 2016; Louvet et al., 2018). Although effort may seem an odd component of agency, it traces back to the pioneering work of Heider (1958) who posited that the action is a function of personal and environmental factors. Personal factors comprise two distinct aspects: ability and motivation (intention, effort). In the same vein, Weiner (1986) noted the importance of the internal factors of ability and effort to understanding of causal explanations of success and failure. In short, effort has played a central role in experience of agency.

² We also measured, but choose not to report, wage with an abstract measure using a scale going from 1 (= low wage) to 7 (= high wage). The results were completely redundant with the open-ended scale ($r = .71$).

³ A potential flaw in this computation approach would occur if participants rated the probability of all occupations equally high. We checked for this possibility, first by computing an exploratory principal component factorial analysis with varimax rotation on probability ratings. The analysis revealed a two factor solution, one factor aggregating high-status occupations (lawyer, veterinary, teacher), the second one aggregating low-status occupations (steward/stewardess, postman, barman). Second, a 5 (future outlook) x 6 (probability ratings) ANOVA revealed a statistically significant interaction, $F(20, 500) = 6.94, p < .001$ showing that probability ratings of the three high-status occupations increased linearly as a function of the outlook (from high pessimist to high optimist) whereas probability ratings of the three low-status occupations decreased as a function of the outlook. Altogether, these results showed that participants clearly differentiated the occupations in their probability ratings in anticipated ways.