SOCIOECONOMIC STATUS PREDICTS META-PERCEPTIONS: HOW, WHY, AND SO WHAT?

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Socioeconomic status predicts meta-perceptions: How, why, and so what?

submitted by Holly R. Engstrom in partial fulfillment of the requirements for

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Abstract

How might a person’s socioeconomic status (SES) affect how she thinks others see her (her meta-perceptions)? One possibility is that people derive their meta-perceptions from cultural stereotypes: That is, low SES people may expect others to see them as warmer, but less competent, than those with high SES. However, low SES people tend to see themselves more negatively and have more negative expectations for how they will present themselves than those with high SES. Thus, another possibility is that low SES people expect others to see them as both colder and less competent than those with high SES. Seven studies, three of them pre-registered, supported the latter possibility: Low SES people thought they would be seen more negatively in terms of both warmth and competence, compared to those with high SES. This occurred in hypothetical interactions (Study 1A-1B), live in-lab interactions (Study 2), and online chat conversations (Study 3A-4B), and was mediated by lower-SES people’s more negative self-views and expectations for self-presentation (Study 1B). However, these expectations were not accurate: Low SES people were not seen differently by others, and if anything were worse at guessing how others saw them (Study 2 but not Study 4A-4B). Moreover, low SES people were more likely than high SES people to believe that negative feedback they received in both warmth (Study 3A-3B) and competence (Study 4A-4B) domains was their own fault; this was related to their more negative meta-perceptions. This thesis uncovers a novel way in which SES affects how people think about interpersonal interactions, and highlights the consequences for attributions for negative feedback and potentially, inequality.
Lay Summary

In this thesis, we investigated how someone’s social status – where they stand in the socioeconomic hierarchy based on their income and education – affects how they expect others to see them. Across seven studies, low-status people expected others to see them as less warm (e.g., friendly, moral) and less competent (e.g., skilled, intelligent) than high-status people did, regardless of whether they were imagining meeting a stranger or actually talking to others. As well, when low-status people learned that another participant chose not to chat with them, or chose not to complete a problem-solving task with them, they were more likely to blame themselves, and this was related to their more negative expectations for how others would see them. If low-status people blame themselves when they get negative feedback, they might be less willing to keep trying, making it harder for them to take opportunities that could help them increase their status.
Preface

This thesis is an original intellectual product of the author, Holly R. Engstrom. The research in Study 1A-1B and 3A-4B was covered by UBC Behavioral Research Ethics Board Certificate number H18-00159. Study 2 uses data collected by Professor Lauren Human at McGill University. The data is used with her permission; the author recognized the data as applicable to this thesis and analyzed the data. All other studies contain data collected by the author at the University of British Columbia. Professor Kristin Laurin was the supervisor on this project and was involved throughout all stages of the project in creating and testing the theoretical ideas, as well as in editing the manuscript.
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Dedication

To my parents, for a lifetime of support, love, encouragement, and getting excited about weird animals.

and

To Mimzy, Yogurt, and Max, because if nothing else, this thesis will provide a nice pile of paper to sit on.
Introduction

Benjamin Kennet, in his self-help book, “What people think of me: Your quick guide to caring less” (2016), promises to teach people how to think less about what others think of them. If this book and the hundreds like it are any indication, people spend a lot of time and energy thinking about their meta-perceptions, or how they are perceived by others (e.g., Carlson, Vazire, & Furr, 2011; Laing, Phillipson, & Lee, 1966; Swami, Waters, & Furnham, 2010). Despite people’s apparent desire to avoid spending so much time thinking about their meta-perceptions, there are important personal and professional consequences to how people expect others to see them. For example, if Sam goes into a job interview expecting that the interviewer will like and respect him, this confidence may translate into comfortable small-talk and ease in remembering his talking points in the interview. In contrast, if Bill goes into the same interview as Sam, but doubts that the interviewer will like and respect him, he might make nervous, awkward conversation, and forget the important points he wanted to raise. Sam might therefore be more likely than Bill to befriend the interviewer and get the job, or if neither happens, at least he is more likely to feel good about the interview process and confident that he will get the next job that comes along.

But where did Bill and Sam’s divergent meta-perceptions come from? In this thesis, we advance the hypothesis that one source of their meta-perceptions is their socioeconomic status (SES), or their relative standing in society based on income, education, and occupational prestige.

SES Shapes Interpersonal Interactions

High and low SES people’s lives differ in many ways. Most obviously, SES is related to material outcomes. For example, low SES people are likely to suffer from more health problems
(e.g., Adler et al., 1994; N. B. Anderson & Armstead, 1995), more difficulty affording necessities (e.g., Boushey, Brocht, Gundersen, & Bernstein, 2001; Shi & Stevens, 2010), and fewer opportunities for their children (e.g., Bradley & Corwyn, 2002; Duncan, Yeung, Brooks-Gunn, & Smith, 1998; Sirin, 2005). But SES is also related to psychological outcomes (e.g., Kraus, Tan, & Tannenbaum, 2013; Pepper & Nettle, 2017; Piff, Kraus, & Keltner, 2018; Stephens, Markus, & Phillips, 2014; Stephens & Townsend, 2013; Twenge & Campbell, 2002), including behavior in interpersonal interactions.

For example, people can accurately infer others’ SES from short in-person conversations, because low SES people tend to show active interest in the conversation by nodding and laughing, whereas high SES people seem disengaged, spending their time doodling and fixing their hair (Kraus & Keltner, 2009). Low SES people also tend to pay more attention to other people (Dietze & Knowles, 2016; Kraus, Piff, Mendoza-Denton, Rheinschmidt, & Keltner, 2012), behave less dominantly in negotiations (Kraus & Mendes, 2014), and choose to help others at their own expense (Piff, Kraus, Côté, Cheng, & Keltner, 2010; Rucker, Galinsky, & Dubois, 2015). In other words, people at different places on the SES spectrum have different interpersonal lives and interactions. But how does SES relate to how people think about these interactions? Specifically, does SES predict how people think they are seen by others?

**SES-Based Meta-Perceptions: Two Competing Hypotheses**

People derive their meta-perceptions from many different sources. Some of these sources are associated with SES: people’s sense of how others stereotype their groups, their own self-perceptions, and their plans for actively managing the impression they convey to others. Considering each of these SES-linked sources of meta-perceptions in turn yields two competing hypotheses about the relationship between SES and meta-perceptions.
Warmth and Competence: Key Dimensions of Meta-Perceptions

Before we delve into these competing hypotheses, we consider what kinds of traits people focus their meta-perceptions on. A large proportion of the variance in social judgments – including interpersonal perceptions, intergroup perceptions, and self-perceptions – can be explained by two fundamental dimensions (Abele & Wojciszke, 2007; Bakan, 1966; Fiske, Cuddy, & Glick, 2007; Fiske, Cuddy, Glick, & Xu, 2002; Paulhus & John, 1998; Peeters & Czapinski, 1990; Phalet & Poppe, 1997; S. Rosenberg, Nelson, & Vivekananthan, 1968; Wiggins, 1979). Different scholars have named these dimensions differently (e.g., Bakan, 1966; Fiske et al., 2002; S. Rosenberg et al., 1968), but in each case, they seem to represent the same underlying constructs (Abele, Cuddy, Judd, & Yzerbyt, 2008; Abele & Wojciszke, 2007; Fiske et al., 2007; Judd, James-Hawkins, Yzerbyt, & Kashima, 2005), which we label here warmth and competence (in line with Fiske et al., 2002). Warmth reflects people’s ability and propensity to interact with and care for others, and it comprises traits like kindness, friendliness, honesty, morality, and gregariousness. Competence reflects people’s ability and propensity to make and execute plans, and it comprises traits like assertiveness, dominance, intelligence, ambition, and efficiency. Because warmth and competence are so fundamental to social judgments, our hypotheses and empirical tests focus on meta-perceptions on these two dimensions.

Low SES people may expect others to see them as incompetent sweethearts. People often derive their meta-perceptions from stereotypes they believe others will ascribe to them based on their group membership (Frey & Tropp, 2006). Group members generally hold similar meta-stereotypes, or views of how others see their group (Klein, Pohl, & Ndagijimana, 2007; Vorauer, Hunter, Main, & Roy, 2000; Vorauer, Main, & O’Connell, 1998), and they often expect to be seen in line with these meta-stereotypes (Finchilescu, 2005; Kamans, Gordijn, Oldenhuis,
Moreover, people’s meta-stereotypes tend to align with how outsiders actually do see their group (Saroglou, Yzerbyt, & Kaschten, 2011; Sigelman & Tuch, 1997). And people expect to be – and are – stereotyped based on their membership in SES groups (e.g., Batruch, Autin, & Butera, 2017; Bird & Bogart, 2001; Darley & Gross, 1983; Sainz, Martínez, Moya, & Rodríguez-Bailón, 2018; Swencionis, Dupree, & Fiske, 2017). Thus, to the extent that these (accurate) meta-stereotypes shape people’s meta-perceptions, high and low SES individuals should expect others to see them in line with actual SES stereotypes.

Together, these lines of reasoning suggest we can look to SES stereotypes to predict SES-linked meta-perceptions. So how are people stereotyped on warmth and competence based on their SES? Warmth captures a group’s perceived intentions, which is linked to competitiveness: People see groups that do not compete with their own group as having more helpful, kind, warm intentions (Fiske et al., 2002; Kervyn, Fiske, & Yzerbyt, 2013). They therefore stereotype low SES people (who – unlike high SES people – do not outcompete others for status) as warmer than high SES people. In contrast, competence captures a group’s perceived ability to carry out their intentions, which is linked to status: People see low status groups as less able to act on the world in the ways that they want (Caprariello, Cuddy, & Fiske, 2009; Kervyn, Fiske, & Yzerbyt, 2015; Russell & Fiske, 2008). People therefore stereotype low SES people as less competent than high SES people. Cross-cultural research has found this pattern of SES stereotyping across 27 different countries (Durante et al., 2014; Durante, Tablante, & Fiske, 2017). Furthermore, this effect did not vary based on participants’ SES, suggesting that people across the SES spectrum understand that these stereotypes exist about their own groups.
Therefore, because people often draw upon stereotypes to form their meta-perceptions, and because people across the SES spectrum are aware of the stereotypes about their SES group, low SES people may expect others to see them as warmer but less competent than high SES people. We refer to this prediction as the *warm-but-incompetent hypothesis*.

**Low SES people may expect others to see them as incompetent jerks.** Stereotypes are not the only source of meta-perceptions: People often also derive their meta-perceptions from their self-perceptions, and from their expectations for self-presentation. Considering these two sources generates a somewhat different prediction about the meta-perceptions of low- and high-SES individuals.

**Self-perceptions.** Meta-perceptions are strongly linked to self-perceptions (Chambers, Epley, Savitsky, & Windschitl, 2008; Kenny & DePaulo, 1993; Malloy & Albright, 1990; Malloy & Janowski, 1992; Reno & Kenny, 1992). In fact, some authors have argued that meta-perceptions are nothing more than self-perceptions – that people derive their view of how others see them purely by projecting how they see themselves (Kenny & DePaulo, 1993). Given what we have already said about meta-stereotypes, this strong view is implausible. Nevertheless, self-perceptions remain *one* important source of meta-perceptions (Carlson et al., 2011).

This has implications for how SES may be linked to meta-perceptions because low SES people tend to have a less positive view of themselves compared to high SES people. For example, a meta-analysis with a combined sample of over 300,000 participants showed that lower SES people have lower self-esteem (Twenge & Campbell, 2002). Similarly, a large cross-cultural study found that lower SES people are less narcissistic (Foster, Campbell, & Twenge, 2003). Lower SES people are also less likely to behave in narcissistic ways, like choosing to look at themselves in a mirror (Piff, 2014). And finally, inducing a sense of low status decreased
people’s state self-esteem and narcissism (Mahadevan, Gregg, & Sedikides, 2019). Thus, overall, lower SES people tend to see themselves more negatively than higher SES people. Because self-perceptions shape meta-perceptions, lower SES people are likely to also expect others to see them more negatively than higher SES people do.

Specifically, low SES people should expect others to see them more negatively in terms of both warmth and competence. People with high self-esteem see themselves as competent and warm, whereas narcissists see themselves as very competent, but only average in terms of warmth (Campbell, Rudich, & Sedikides, 2001). Thus, people low in both self-esteem and narcissism – like those low in SES – are likely to see themselves (and therefore expect to be seen by others) as less warm and less competent, compared to others (although if the effects of self-esteem and narcissism are compounding, this effect may be stronger for competence). We refer to this prediction as the *cold-and-incompetent hypothesis*.

**Self-presentation.** Considering a third source of meta-perceptions yields a similar prediction. Specifically, people often try to control the impressions others form of them by strategically presenting a certain image of themselves (Baumeister, 1982; Baumeister & Tice, 1986; Elliott, 1979; Gibbs, Ellison, & Heino, 2006; Jones & Pittman, 1982; Leary & Kowalski, 1990; Snyder, 1974): Scholars try to sound erudite, pro wrestlers try to look menacing, and teenagers try to seem cool. Self-presentation is therefore conceptually linked to meta-perceptions. People’s intentions to manage others’ impression of them, and their confidence in their ability to do so, should shape what they expect those impressions to look like: Scholars who intend to give an impressive talk, and who believe they can do so, should expect to be seen more positively than those with no such intent, or those who fear public speaking. Some empirical evidence supports this idea that self-presentation shapes meta-perceptions. For example, people
who try hard to convey a good impression on social media think others will indeed form a good impression of them (Toma & Carlson, 2015).

Thus, those who hold both the intention to present themselves in a positive light and the confidence that they can do so successfully will have more positive meta-perceptions. Individuals with low SES, compared to high SES, are less likely to hold this intention and this confidence. For one thing, low SES people’s more communal and interdependent orientation (Shepherd & Stephens, 2010; Stephens, Fryberg, & Markus, 2011; Stephens, Markus, & Townsend, 2007; Stephens, Townsend, Rose, & Phillips, 2012) may make them more reluctant to show off or manipulate others by conveying a positive image of themselves. Indeed, unlike people with an independent self-construal, people with a more interdependent self-construal disapprove more of favorable self-presentation (Kim, Kim, Kam, & Shin, 2003), and perhaps because of their more interdependent self-construal, lower SES people are less comfortable than high SES people using strategic self-presentation to get ahead (Belmi & Laurin, 2016).

For another, even if a low SES person did intend to convey a good impression, she may feel less confident in her ability to do so. Low SES people tend to have lower confidence and self-efficacy in general (Belmi, Neale, Reiff, & Ulfe, 2019; Boardman & Robert, 2000), so they may doubt their ability to pull off a good impression. Thus, low SES people are likely less inclined to try to present themselves in a positive light, both because this is at odds with their more interdependent orientation and because they may doubt their ability to do so.

This, like the evidence reviewed about self-perceptions, suggests that low SES people should have more negative meta-perceptions across both warmth and competence. Both warmth and competence are highly desirable traits (Fiske et al., 2007), so in most situations, the ideal impression to convey would be one of warmth and competence. Indeed, in many situations,
people’s main self-presentation goal is to redress someone else’s perceptions of their low warmth or low competence (Swencionis et al., 2017; Swencionis & Fiske, 2016). Taken together, evidence about the relationship between SES and self-perceptions, and between SES and self-presentation, suggests that low SES people will expect others to see them as both less competent and colder than high SES people do – again, the cold-and-incompetent hypothesis.

**Predictions for Downstream Consequences**

Our review of the existing literature yields two overlapping, but different, predictions for how people at different levels of SES might expect others to see them. Low SES people may expect to be perceived as warmer but less competent, or as colder and less competent, than high SES people. In either case, the relationship between SES and meta-perceptions likely has downstream consequences for how individuals explain their failures in warmth and competence domains.

People’s expectations about whether they will succeed or fail on a task often determine how they explain how they ultimately fare on that task (Feather, 1969; Feather & Simon, 1971a, 1971b; Ross & Miller, 1975). When their expectations align with the outcome – when they fail at a task they had expected to fail at – they tend to attribute the outcome to internal factors. For example, people who believe they are socially inept and that no one likes them tend to attribute a date that goes poorly to internal factors, like lack of skill. In contrast, when people’s expectations are contrary to the outcome – if they fail at a task they had instead expected to succeed at – they tend to attribute the outcome to external factors. For example, people who believe they are smooth operators beloved by all attribute a date that goes poorly to external factors, like how awkward first dates are (Girodo, Dotzenroth, & Stein, 1981). Similarly, people with low self-esteem tend to attribute failure (which they expect) on a dot-estimation task more to poor effort,
while those with higher self-esteem attribute failure (which they do not expect) more to bad luck (Fitch, 1970).

Thus, people’s expectations about how others will see them (that is, their meta-perceptions) are likely to shape how they explain it when others seem them as unfriendly or incompetent. For example, if a low SES person expects others to see her as incompetent, then discovers she did not get a job that she interviewed for, she may believe that she failed to get the job because she performed poorly in the interview. In contrast, if a high SES person expects to be seen as competent, and similarly discovers that he did not get a job, he may believe that he failed to get the job not because of anything he did in the interview, but rather because the company had always planned to go with the inside hire, or because the company had always planned to hire a woman to increase diversity.

Defining SES and Its Facets

Before outlining our empirical research, we address one important remaining question: What is SES, and are there different facets of SES that are more relevant to meta-perceptions than others?

SES comprises two categories of facets: objective resources that grant status (e.g., income and education), and subjective perceptions of one’s resources and status compared to others’ (Adler et al., 1994; Adler, Epel, Castellazzo, & Ickovics, 2000; Adler & Ostrove, 1999; C. Anderson, Kraus, & Keltner, 2012; Belmi & Laurin, 2016; Cohen, Shin, Liu, Ondish, & Kraus, 2017; Piff et al., 2018). These categories vary in the extent to which they predict certain SES-linked traits (e.g., C. Anderson et al., 2012; Belmi & Laurin, 2016). Which category is most linked with the meta-stereotype, self-perception, and self-presentation routes to meta-perceptions we have laid out here?
Beginning with meta-stereotypes, the critical question is who believes they will be perceived in line with the low- versus high-SES stereotypes. It seems likely that people expect to be stereotyped in line with the level of social status they subjectively perceive themselves to hold. For example, if a person has an objectively low income, but does not subjectively feel that he is part of the lower class (perhaps because everyone he knows has an even lower income), he has no reason to believe he will be stereotyped as warm but incompetent.

Next, looking to self-perceptions and self-presentation, the critical questions are (1) who sees themselves negatively, and (2) who expects to present themselves less positively. Again, people’s views of themselves and self-presentation expectations correspond better to their subjective perceptions of their own status than to their objective perceptions. First, people’s self-views are more strongly linked to their subjective status than their objective status (Kraus & Park, 2014; Mahadevan et al., 2019). If a person has objectively low resources and status, but does not subjectively feel that he has less than others around him, he has little reason to feel badly about his own economic success, and by extension, himself as a whole. Second, it is particularly people with low subjective status who feel both more uncomfortable with strategic self-presentation, and less powerful and in control (and therefore perhaps less in control of how others see them; (and therefore perhaps less in control of how others see them; Belmi & Laurin, 2016; Rucker et al., 2015).

Thus, under both our hypotheses, we tentatively posit that subjective indicators of SES may be better predictors of meta-perceptions than objective measures, because it is the subjective feeling of being lower-class that likely predicts meta-stereotypes, self-perceptions, and self-presentation.

Overview of Studies
In Study 1A-1B, participants imagined interacting with someone else, and rated how they expected that person would see them. In Study 2, we conceptually replicated the pattern from Study 1 using live, in-person interactions. In Study 3A-4B, we tested the implications of the link between SES and meta-perceptions for self-blame in response to negative feedback in a warmth domain (Study 3A-3B) and a competence domain (Study 4A-4B).

**Study 1A-1B**

Study 1A-1B tested whether SES is correlated with meta-perceptions of warmth and of competence, and if so, in what direction. Study 1A explored these questions using an online self-report study where, as part of a larger study unrelated to this thesis, Canadian undergraduate participants told us how they expected to be seen in a hypothetical interaction. Study 1B confirmed the findings from Study 1A in a pre-registered replication using a sample of American MTurk workers. Study 1B also investigated our theoretically-derived mechanisms for the link between SES and meta-perceptions.

**Study 1A**

**Method.**

*Participants and sample size.* We collected data from 192 Canadian undergraduate participants. Five participants did not complete our meta-perception measures, resulting in a final sample of 187 (31 male, mean age = 20.70, 32% White, 38% East Asian). No participants were excluded from our analyses.

*Procedure.* Participants first completed several self-report measures unrelated to the purpose of this study. Following this, they reported their demographics, including subjective and objective measures of SES. We measured subjective SES using a ladder with 10 rungs, where participants are told to select which rung they would fall on if the rungs ranged from the lowest...
to the highest class (Adler et al., 1994; Kraus, Adler, & Chen, 2013). We measured two indicators of objective SES: parents’ combined yearly income (where participants select between 15 options ranging from “below $15,000” to “above $145,000”) and parents’ highest level of education (averaged across two separate questions, one for each parent, where participants select between 6 options ranging from “less than high school” “professional or graduate degree (e.g., PhD, MD)”).

After reporting their demographics, participants told us how they thought they would be seen in a hypothetical interaction. We asked them to “Imagine you were meeting someone for the first time. Please answer the following questions about how you think that person would probably see you. In other words, what would that person think about YOU?”. We then asked how they thought that person would see them in terms of both warmth and competence. Warmth includes two facets, sociability (e.g., friendliness, likeability) and morality (e.g., trustworthiness, honesty) (Abele et al., 2016). Research suggests that low SES people may be more moral than high SES people (e.g., Piff et al., 2010; Piff, Stancato, Côté, Mendoza-Denton, & Keltner, 2012; Piff & Robinson, 2017). For that reason, we thought it was possible that these two meta-perception dimensions would differ; we therefore measured both separately in all studies (except Study 2). We had no specific hypotheses as to how these facets might differ. Since we generally found that they did not we report analyses collapsing them together, and note any points at which they do differ. See Appendix: Supplemental Table 1 for analyses for each facet separately for all studies (except Study 2).

We used four items to measure each meta-perception type (sociability, e.g., “likeable”, “kind”; morality, e.g., “trustworthy”, “honest”; and competence, e.g., “capable”, “intelligent”). We then averaged across the eight warmth items (four for sociability and four for morality to
create a score for warmth meta-perceptions ($\alpha = .88$), and across the four competence items to create a score for competence meta-perceptions ($\alpha = .84$). Each item was measured on a 7-point scale (1 = not at all, 4 = somewhat, 7 = extremely) and was phrased as “How ________ would they think you are?”. All items were similar or identical to those used in previous research (e.g., Abele et al., 2016; Fiske et al., 2002).

**Results.** In all analyses for this and all other studies, we controlled for gender by including it as an effect-coded covariate (-1 female, 1 = male), because men and women are likely to differ in their expectations of how others will view them on stereotype-relevant traits like warmth and competence (Fiske et al., 2002; Glick & Fiske, 2001; Wout, Shih, Jackson, & Sellers, 2009). That is the analysis laid out in our advance plans for the studies we pre-registered; however, in all studies results remain the same if we remove this covariate.

**Does SES predict meta-perceptions?** We ran separate linear regression analyses predicting warmth and competence meta-perceptions with each of our measures of SES (see Table 1). Subjective SES was positively related to meta-perceptions of both warmth and competence, meaning that participants who placed themselves lower on the socioeconomic ladder, compared to those who placed themselves higher, expected a stranger to perceive them as less warm and less competent. This supports the cold-and-incompetent hypothesis. Objective SES measures, in contrast, showed a less consistent relationship to meta-perceptions: Parental income was positively related to meta-perceptions of competence but not warmth (though participants with higher-income parents expected to be seen as more sociable, when we examined the two facets of warmth separately; see Appendix: Supplemental Table 1), whereas parental education was unrelated to both types of meta-perceptions.
Table 1

Regression analyses with SES predicting meta-perceptions, Study 1A-1B.

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<th>SE</th>
<th>β</th>
<th>t</th>
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<td>Subjective SES</td>
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<td>.04</td>
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<td>.04</td>
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<td>.19</td>
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<td>-.01</td>
<td>.05</td>
<td>-.02</td>
<td>-.25</td>
<td>.804</td>
</tr>
</tbody>
</table>

**Note:** All models were run separately (i.e., with only one SES predictor at a time), and all include gender as a covariate (effect coded so -1 = female, 1 = male).

Does the relationship between SES and meta-perceptions differ based on meta-perception dimension? Because subjective SES was positively related to both warmth and competence meta-perceptions, we next wanted to test whether these relationships were equally large and positive. If they were, this would further support the cold-and-incompetent hypothesis.

We ran a multilevel regression analysis using the lmerTest package in R (Kuznetsova, Brockhoff, & Christensen, 2017) in which we predicted meta-perceptions with subjective SES, meta-perception dimension (effect coded so -1 = warmth, 1 = competence), the interaction between meta-perception dimension and SES, and random intercepts for participants. There was no significant interaction between meta-perception dimension and SES (see Table 2 and Figure 1), meaning that subjective SES was equally positively related to both warmth and competence meta-perceptions. This further supports the cold-and-incompetent hypothesis.
Table 2

Interaction between meta-perception dimension and SES predicting meta-perceptions, Study 1A-1B and 3A-4B.

<table>
<thead>
<tr>
<th>Study</th>
<th>Subjective SES</th>
<th>Meta-perception dimension</th>
<th>Subjective SES X meta-perception dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>SE b</td>
<td>β</td>
</tr>
<tr>
<td>1A</td>
<td>.17</td>
<td>.04</td>
<td>.26</td>
</tr>
<tr>
<td>1B</td>
<td>.09</td>
<td>.03</td>
<td>.20</td>
</tr>
<tr>
<td>3A</td>
<td>.08</td>
<td>.06</td>
<td>.11</td>
</tr>
<tr>
<td>3B</td>
<td>.14</td>
<td>.05</td>
<td>.22</td>
</tr>
<tr>
<td>4A</td>
<td>.16</td>
<td>.03</td>
<td>.28</td>
</tr>
<tr>
<td>4B</td>
<td>.18</td>
<td>.03</td>
<td>.29</td>
</tr>
</tbody>
</table>

Note: All models were run separately, and all include gender as a covariate (effect coded so -1 = female, 1 = male). Subjective SES is mean-centered; meta-perception dimension is effect-coded (so -1 = warmth, 1 = competence).
The relationship between SES and meta-perceptions does not differ across meta-perception dimension.

Note: A small amount of random noise is added to subjective SES to make it easier to see these points.

**Study 1B**

The study hypotheses, method, and analysis plan were all pre-registered on the Open Science Framework (https://osf.io/g93e7/?view_only=3a119f15823d4737a9c4b6b0a2baf1bfo). All measures are available in the materials uploaded along with that pre-registration. In keeping with the results of Study 1A, we predicted that participants with lower SES would expect others to see them as both colder and less competent. We also predicted that this relationship would be independently mediated by both self-regard and self-presentation, based on our theorizing regarding the two possible mechanisms for the cold-and-incompetent hypothesis. Based on the...
results from Study 1A, we pre-registered subjective SES and childhood income as our primary
SES measures; all other SES measures were exploratory.

**Method.**

**Participants and sample size.** We pre-registered collecting data from 300 MTurk participants. According to G*Power (Erdfelder, Faul, Buchner, & Lang, 2009), this sample size provides over 90% power to detect a correlation of $r = .20$. All participants had a 95% task approval rating, completed the study from a computer rather than a mobile phone, came from the United States, and had completed fewer than 5000 studies on MTurk (so that we could avoid participants with extensive experience with psychology studies; all these recruitment criteria applied to all further MTurk studies reported here). In total, 311 participants completed the study. As pre-registered, we excluded participants who failed one or both of two attention checks (e.g., “Please select 6 if you are paying attention”; $n = 21$) and participants who had technical problems with the survey ($n = 1$). Because we preregistered controlling for gender in all our analyses, we also excluded one person who listed their gender as genderqueer. Finally, one participant did not complete the subjective SES measure. A final sample of 287 participants provided the data we use in our analyses (165 male, mean age = 35.66, 75% White).

**Procedure.** This study had three parts. In Part 1, participants imagined interacting with two target people and rated how they thought those targets would see them (i.e., their meta-perceptions), and how they expected to self-present in each interaction. We provided a description, name, and image of each target to make it easier for participants to imagine this interaction. As well, we described them interacting with one target at a party, and with the other at a work meeting. These situations served simply to make it easier for participants to imagine this interaction; as per our pre-registration we collapsed across them in our analyses. The survey
randomly paired target names and descriptions with one of the two situations for each participant (so some participants would imagine interacting with one target at a party, while others would imagine interacting with that target in the workplace) and with one of four White male face images obtained from the Chicago Face Database (Ma, Correll, & Wittenbrink, 2015). See Figure 2 for an example.

Figure 2

*Sample target image and description, Study 1B.*

This is Adam.

Adam’s favourite colour is red. He enjoys watching TV shows and movies, and he has a pet fish. He normally eats cornflakes for breakfast. He prefers sweet snacks over salty ones.

Please imagine you met Adam in a **meeting at work and you wanted your companies to work together on a project.**
We measured meta-perceptions of warmth and competence with each target using the same items as in Study 1A. We randomly assigned two items from each meta-perception dimension to appear with each target, and then averaged across targets to create our composite measures. After rating their meta-perceptions, for each imagined interaction, participants rated their self-presentation intentions and confidence with each target with two items: “How hard would you try to convey a good impression to [target’s name] in this situation?” (1 = not try at all, 4 = try somewhat, 7 = try very hard), and “If you did try hard to convey a good impression, how successful do you think you would be?” (1 = I probably wouldn’t be able to convey a good impression, 7 = I would definitely be able to convey a good impression). Participants rated these items twice, once with each target, so we averaged across all four ratings to obtain a composite measure of self-presentation, $\alpha = .70$. We pre-registered this composite as our primary measure of self-presentation.

In Part 2, participants completed demographics questions, including our SES measures. We pre-registered subjective SES and childhood family income as our primary SES measures based on the results of Study 1. We also pre-registered several exploratory SES measures. Our subjective SES measure was identical to that in Study 1A, except that we also asked participants to briefly describe why they placed themselves where they did on the ladder. We measured childhood income by asking participants to provide their best estimate of their family’s yearly household income while growing up by selecting from 8 response options ranging from <$15,000 to >$150,000. Our exploratory measures included participants’ annual income, total household income, education, and parents’ education.

\[1\] Part 1 and Part 2 were assigned in random order across participants; we found no order effects. All participants completed Part 3 at the end of the study, after Parts 1 and 2.
In Part 3, we measured our second hypothesized mechanism: self-regard. To do so we measured both self-esteem and narcissism (in random order), standardized them, and then summed them together. We measured self-esteem using the Rosenberg Self-Esteem scale (M. Rosenberg, 1965), a 10-item scale in which participants rate their agreement with each item on a 1 (strongly disagree) to 7 (strongly agree) scale. Sample items include “On the whole, I am satisfied with myself” and “I feel I do not have much to be proud of” (reverse-scored). We measured narcissism using the short version of the Narcissistic Personality Inventory (Ames, Rose, & Anderson, 2006). This is a 16-item forced-choice scale where, for each item, participants select which of two statements best describes them. For each item, one of the two statements represents a response consistent with narcissism, e.g., “Everybody likes to hear my stories” (narcissistic response) versus “Sometimes I tell good stories” (non-narcissistic response).

**Results.**

*Does SES predict meta-perceptions?* We ran separate linear regression models for each dependent measure with each of our primary and exploratory SES measures (see Table 3). Subjective SES was significantly and positively related to meta-perceptions of warmth and competence. That is, consistent with the cold-and-incompetent hypothesis, and in line with Study 1A, those with lower subjective SES expected to be seen more negatively in terms of both warmth and competence. However, childhood income was unrelated to both meta-perception dimensions. Of our exploratory SES measures, only annual income and participant education were related to meta-perceptions, and these were only related to meta-perceptions of competence, not warmth. Household income and parental education were unrelated to both dimensions of meta-perceptions.
Because we again found a positive relationship between subjective SES and both meta-perception dimensions, we next tested whether meta-perception dimension and SES interacted to predict meta-perceptions (using the same method as in Study 1A). Again, we found no significant interaction (see Table 2 and Figure 1), meaning that subjective SES was equally positively related to both warmth and competence meta-perceptions. This further supports the cold-and-incompetent hypothesis.

Are these effects mediated by self-presentation expectations and/or self-regard?

Because we did not find an effect of childhood income or any of our exploratory SES measures on meta-perceptions, we only test for mediation with subjective SES. As hypothesized, subjective SES was significantly and positively related to both self-regard and self-presentation (see Table 4) which in turn were weakly positively correlated, $r = .12, p = .049$. We used the PROCESS macro in SPSS (Hayes, 2018) to bootstrap 10,000 samples to test for indirect effects
separately for meta-perceptions of warmth and competence. In each case, we ran models testing each potential mediator separately, and models testing them as simultaneous mediators. In all cases, there was a significant indirect effect of subjective SES on meta-perceptions through both mediators for both warmth and competence (see Table 4); the effects through self-presentation were significantly larger than those through self-regard (see Table 5). These results support the theoretical rationale underlying the cold-and-incompetent hypothesis: Low SES people expected to be viewed more negatively, perhaps because they see themselves more negatively, and feel neither able nor willing to self-present in a more positive way.²

² We also conducted two exploratory analyses worth noting. First, we tested the components of our mediators (self-presentation: intended effort and expected success; self-regard: narcissism and self-esteem) as separate mediators. Neither component of self-regard alone showed a consistent indirect effect; in contrast, both components of self-presentation did, with confidence explaining a larger proportion of the effect than intentions. Second, we also measured self-perceptions of warmth and competence and found that the association between subjective SES and meta-perceptions held even controlling for how participants saw themselves on the exact same dimensions. This suggests that participants do distinguish between how they see themselves and how they will be seen by others, consistent with other research showing that meta-perceptions are not solely derived from self-perceptions (e.g., Carlson et al., 2011). See Appendix: Supplemental Tables 2 and 3 for more detail on these analyses.
Table 4

Primary mediation analyses, Study 1B, testing each mediator separately.

<table>
<thead>
<tr>
<th>Mediator</th>
<th>Meta-perception dimension</th>
<th>a</th>
<th>b</th>
<th>a*b</th>
<th>c</th>
<th>c'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-regard</td>
<td>Competence</td>
<td>.16</td>
<td>.25</td>
<td>&lt;.001</td>
<td>.03</td>
<td>.06</td>
</tr>
<tr>
<td>Warmth</td>
<td></td>
<td>.12</td>
<td>.17</td>
<td>.005</td>
<td>.02</td>
<td>.04</td>
</tr>
<tr>
<td>Self-presentation</td>
<td>Competence</td>
<td>.11</td>
<td>.24</td>
<td>&lt;.001</td>
<td>.07</td>
<td>.14</td>
</tr>
<tr>
<td>Warmth</td>
<td></td>
<td>.58</td>
<td>.58</td>
<td>&lt;.001</td>
<td>.07</td>
<td>.15</td>
</tr>
</tbody>
</table>

Note: The independent variable for all these analyses is subjective SES. All models were run separately (i.e., with one mediator per model), and include gender as a covariate.

Table 5

Primary mediation analyses, Study 1B, testing mediators in parallel.

<table>
<thead>
<tr>
<th>Mediator</th>
<th>Meta-perception type</th>
<th>b</th>
<th>a*b</th>
<th>95% CI_{\beta}</th>
<th>c'</th>
<th>95% CI_{\beta}</th>
<th>Contrast between indirect effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-regard</td>
<td>Competence</td>
<td>.14</td>
<td>.19</td>
<td>&lt;.001</td>
<td>.02</td>
<td>.05</td>
<td>[.02, .08]</td>
</tr>
<tr>
<td>Self-presentation</td>
<td>Competence</td>
<td>.57</td>
<td>.57</td>
<td>&lt;.001</td>
<td>.06</td>
<td>.14</td>
<td>[.06, .21]</td>
</tr>
<tr>
<td>Self-regard</td>
<td>Warmth</td>
<td>.10</td>
<td>.14</td>
<td>.005</td>
<td>.02</td>
<td>.03</td>
<td>[.01, .07]</td>
</tr>
<tr>
<td>Self-presentation</td>
<td>Warmth</td>
<td>.58</td>
<td>.59</td>
<td>&lt;.001</td>
<td>.07</td>
<td>.14</td>
<td>[.07, .22]</td>
</tr>
</tbody>
</table>

Note: The independent variable for all these analyses is subjective SES. All models were run with both mediators simultaneously, and include gender as a covariate. Paths a and c are omitted because they are presented in Table 4.
Discussion

In Study 1A we found preliminary evidence that SES is related to meta-perceptions, and that it is related in a way that supports our cold-and-incompetent hypothesis: Participants who felt lower in status expected others to see them more negatively than participants who felt higher in status. We pre-registered and replicated this effect with a different sample and method in Study 1B. That is, although low SES people know stereotypes depict them as warmer but less competent than high SES people (Durante et al., 2014), they expect to be seen as colder and less competent than high SES people do. Our mediation analyses in Study 1B further support the theoretical rationale underlying this hypothesis: People with low SES think less of themselves and of their self-presentational abilities, which explains why they expect others to see them more negatively.

As we had tentatively predicted in the introduction, this effect was most consistent with subjective measures of SES. Objective measures of SES yielded no clear pattern of support for either hypothesis: They were only occasionally related to either dimension of meta-perceptions. This is unsurprising, considering that subjective SES is more strongly linked to both self-perceptions and self-presentation (both in previous research, e.g., Belmi & Laurin, 2016; Kraus & Park, 2014; and in our data), and those are the mechanisms we predicted would shape meta-perceptions. We examine this divergence between objective and subjective SES more extensively in our General Discussion, but here briefly consider and rule out one possible alternative explanation for these results.

Specifically, these weaker results with objective SES suggest our effects could have arisen simply because of our variables’ shared variance with positive self-regard. That is, perhaps we have only found that subjective SES only predicts meta-perceptions because both
merely reflect self-regard: People with positive views of themselves might both place themselves on a high rung on the SES ladder and expect to be seen positively by others. However, two pieces of evidence from Study 1B repudiate this alternative possibility. For one, although self-regard did partially mediate the relationship between SES and meta-perceptions, it left a significant indirect effect unaccounted for. In other words, even when we statistically equated self-regard across participants at all levels of SES, the lower SES participants continued to expect others would see them more negatively than the higher SES participants. For another, when we controlled for self-perceptions of warmth and competence, we continued to find the same results: Lower SES participants expected others to see them as even more cold and incompetent than they saw themselves (see Footnote 2). This suggests that SES is linked with meta-perceptions in a way that cannot be explained simply by positive self-views. It also demonstrates that if two people have equally positive views of themselves, but one has lower SES than the other, the low-SES person will be less confident that her positive qualities will be recognized by others.

**Study 2**

In Study 1A and 1B, low SES people imagined that they would be seen more negatively in hypothetical interactions. But would SES still predict meta-perceptions in real-world interactions, where there are many more cues that people can use to determine their meta-perceptions (for example, the other person’s behavior)? In Study 2, we answer this question using a round-robin design with live interpersonal interactions.

This study’s design also allowed us to explore meta-accuracy, or the extent to which a person’s meta-perceptions align with how they were actually perceived, and whether individuals are more accurate at one end or the other of the SES spectrum. That is, are low SES people
overly pessimistic? Are high SES people overly optimistic? Or are both groups equally accurate, meaning that low SES people really are seen more negatively than high SES people? The answer to these questions matters for us to understand the consequences of the link between SES and meta-perceptions. For example, if a low SES person expects that an interviewer will see her as incompetent and therefore decides not to take the interview, she might have successfully avoided embarrassing herself and wasting her time (if her meta-perceptions are accurate), or she might have forgone a valuable opportunity (if her meta-perceptions are inaccurate).

Methods

**Participants and sample size.** In total, 546 undergraduate students participated in this study (80 male, 463 female, 3 identified as a different gender; mean age = 20.42; 53% White, 20% East Asian). Because we controlled for gender in this study (and all other studies), we excluded the three participants who identified as a different gender from analyses, resulting in a final sample of 543 (some participants did not complete all SES measures, so the sample size varies slightly depending on which SES measure we analyze).

**Procedure.** Participants came into the lab in groups of three to eight people (average group size = 6.35, modal group size = 6). They first completed demographics questions, including SES measures. Because our theorizing and empirical evidence thus far suggests that subjective SES should be a stronger predictor of meta-perceptions than objective SES, we would have preferred to use a subjective SES measure in this study as well. However, because no such measure was included in this study, we instead use all other available SES measures: current annual income, current household income, annual household income while growing up, highest educational degree achieved, both parents’ highest educational degree achieved, and both parents’ total years of education.
Next, participants interacted with each member of their group in a round robin design. After each interaction, they rated their perceptions and meta-perceptions of their interaction partner. For both measures, they rated the same 12 items on a 1 (strongly disagree) to 7 (strongly agree) scale. For meta-perceptions, the items began with the sentence stem “This person sees ME as someone who…”, whereas for perceptions, the items began with the sentence stem “I see this person as someone who…”. Two of the 12 items measured intelligence: “Is intelligent” and “Is bright”. The remaining 10 items measured the Big Five traits (John & Srivastava, 1999), with two items tapping into each trait. For example, the two items for agreeableness were “Is helpful and unselfish with others” and “Tends to find fault with others” (reverse-scored). For each trait, the two items were selected based on both factor loading (John & Benet-Martínez, 1998) and accessibility.

These items do not directly assess warmth or competence. To use participants’ responses to test our hypotheses about warmth and competence, we therefore had to find out the degree to which each item reflected warmth and competence. Six coders rated each meta-perception item for warmth (ICC = .86) and competence (ICC = .90). Specifically, for warmth [competence] they were asked “To what extent would strongly agreeing that you have the following trait indicate that you are warm [competent]? In other words, how warm [competent] do you think someone who has this trait is likely to be?”, where 1 = very cold [very incompetent], 7 = very warm [very competent]. We then used these item-level ratings to predict participants’ item-level responses: How much did participants believe they were seen in line with traits that reflected more, rather than less, warmth and competence? Crucially, we tested whether SES moderated this relationship: Did high SES participants show this positive meta-perception more strongly than low SES participants?
Results

Because these studies involved interactions between two people, there may be both target effects (e.g., one person might generally think she is seen positively across these different interactions), and perceiver effects (e.g., one person might generally be rude towards others, such that everyone who interacts with that person believes they were seen negatively). We therefore included random effects for both target and perceiver in all models to control for any such effects.

Meta-perceptions. Because in this study we did not have direct measures of warmth and competence, we instead tested whether participant SES interacts with the item-level warmth and competence ratings to predict participants’ item-level meta-perceptions. A positive interaction between SES and warmth/competence ratings would indicate that participants with lower SES are more likely to endorse meta-perception items that reflect low warmth/competence, and less likely to endorse meta-perception items that reflect high warmth/competence, relative to participants with higher SES. In other words, a positive interaction for both warmth and competence would support the cold-and-incompetent hypothesis, because it would mean that low SES people believe others see them as colder and more incompetent, and less warm and competent, compared to high SES people.

In our first multilevel regression analyses, we predicted target meta-perceptions with target SES, coders’ average warmth ratings of each item, the interaction between warmth ratings and SES, and random intercepts for targets and perceivers (see Table 6). In line with the cold-and-incompetent hypothesis, but contrary to the warm-but-incompetent hypothesis, there was a significant positive interaction between SES and warmth ratings for all measures of SES involving income. Again, as in Study 1A-1B, lower-SES participants expected others to see them
as less warm than higher-SES participants. However, there were no significant interactions for SES measures involving parental education, and there was a significant negative interaction for participant education, such that participants who were less educated believed others saw them as warmer than those who were more educated. This pattern does not emerge in any other studies, and participant education is an unusual SES measure in a sample of undergraduates (who all have very similar levels of education), we do not discuss this finding further.

In our second analyses, we used the same method, but replaced warmth ratings with competence ratings (see Table 6). In line with both hypotheses, there was a significant positive interaction between SES and competence ratings for all measures of SES involving income: As in Study 1A-1B, lower-SES participants expected to others to see them as less competent than higher-SES participants. This held whether we examined household income, annual income, or family income while growing up. However, there were no significant interactions for SES measures involving education. These results with income conceptually replicate those in Study 1A-1B, supporting the cold-and-incompetent hypothesis.

---

3 As in Study 1A-1B, we also assessed whether the relationship between SES and meta-perceptions held controlling for self-perceptions. The interactions with household income and childhood income (but not annual income) remained highly significant after controlling for perceiver self-perceptions (see Appendix: Supplemental Table 4 for more details on this analysis).
Table 6

*Multilevel regression analyses predicting meta-perceptions, Study 2.*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Model with competence rating of traits</th>
<th>Model with warmth rating of traits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(b)</td>
<td>(SE)</td>
</tr>
<tr>
<td>Annual income</td>
<td>-.002</td>
<td>.01</td>
</tr>
<tr>
<td>Trait rating</td>
<td>.47</td>
<td>.004</td>
</tr>
<tr>
<td>Annual income X trait rating</td>
<td>.01</td>
<td>.004</td>
</tr>
<tr>
<td>Household income</td>
<td>-.01</td>
<td>.01</td>
</tr>
<tr>
<td>Trait rating</td>
<td>.48</td>
<td>.005</td>
</tr>
<tr>
<td>Household income X trait rating</td>
<td>.01</td>
<td>.002</td>
</tr>
<tr>
<td>Income growing up</td>
<td>.003</td>
<td>.01</td>
</tr>
<tr>
<td>Trait rating</td>
<td>.48</td>
<td>.005</td>
</tr>
<tr>
<td>Income growing up X trait rating</td>
<td>.02</td>
<td>.003</td>
</tr>
<tr>
<td>Education</td>
<td>.01</td>
<td>.02</td>
</tr>
<tr>
<td>Trait rating</td>
<td>.48</td>
<td>.005</td>
</tr>
<tr>
<td>Education X trait rating</td>
<td>.002</td>
<td>.01</td>
</tr>
<tr>
<td>Parents’ average highest educational degree</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>Trait rating</td>
<td>.48</td>
<td>.005</td>
</tr>
<tr>
<td>Parents’ average highest educational degree X trait rating</td>
<td>.004</td>
<td>.004</td>
</tr>
<tr>
<td>Parents’ average years of education</td>
<td>.001</td>
<td>.003</td>
</tr>
<tr>
<td>Trait rating</td>
<td>.49</td>
<td>.004</td>
</tr>
<tr>
<td>Parents’ average years of educational X trait rating</td>
<td>-.001</td>
<td>.001</td>
</tr>
</tbody>
</table>

Note: All predictors are grand-mean-centered. All models were run separately and include gender as a covariate (effect coded so -1 = female, 1 = male) and random intercepts for targets and perceivers. The dependent variable for all models is meta-perceptions.

**Meta-accuracy.** To explore whether SES is related to meta-accuracy, we tested whether participants at different levels of SES showed different relationships between their meta-perceptions and perceivers’ actual perceptions of them, where stronger positive relationships indicate greater accuracy. We predicted target meta-perceptions with target SES, perceptions of the target, and their interaction, along with random intercepts for targets and perceivers. We only examined the measures of SES involving income because only those measures were linked to meta-perceptions of warmth and competence. Overall, there was a strong positive relationship...
between meta-perceptions and perceptions, suggesting that people on average are fairly accurate at guessing how others perceive them (see Table 7). However, this relationship was qualified by a significant positive interaction between all three income measures of SES and perceptions: Participants with higher SES were even more accurate (for example, at 1 SD above the mean family income while growing up, the relationship between perceptions and meta-perceptions was $b = .48, p < .001$), whereas those with lower SES were somewhat less so (at 1 SD below the mean, $b = .40, p < .001$). Thus, people with low income, or who grew up in low-income households, have less accurate meta-perceptions, meaning that they have overly pessimistic views of how they are seen in interpersonal interactions. Indeed, contrary to their expectations, low-income people were not seen as less warm or competent by perceivers compared to high-income people (see Appendix: Supplemental Table 5 for details on this analysis).

Table 7

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$b$</th>
<th>SE $b$</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual income</td>
<td>-.003</td>
<td>.01</td>
<td>-.22</td>
<td>.829</td>
</tr>
<tr>
<td>Perceptions</td>
<td>.44</td>
<td>.004</td>
<td>107.77</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Annual income X perceptions</td>
<td>.01</td>
<td>.004</td>
<td>2.47</td>
<td>.013</td>
</tr>
<tr>
<td>Household income</td>
<td>-.005</td>
<td>.01</td>
<td>-.84</td>
<td>.401</td>
</tr>
<tr>
<td>Perceptions</td>
<td>.44</td>
<td>.004</td>
<td>102.95</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Household income X perceptions</td>
<td>.01</td>
<td>.002</td>
<td>4.34</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Income growing up</td>
<td>.003</td>
<td>.01</td>
<td>.47</td>
<td>.639</td>
</tr>
<tr>
<td>Perceptions</td>
<td>.44</td>
<td>.004</td>
<td>104.36</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Income growing up X perceptions</td>
<td>.02</td>
<td>.002</td>
<td>10.14</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Note: All variables are grand-mean-centered. All models include random intercepts for perceivers and targets. The dependent variable for all models is meta-perceptions.

Discussion

After short in-person interactions, undergraduate students with lower income or from lower-income backgrounds thought they others saw them as colder and less competent than higher-income students. This further supports the cold-and-incompetent hypothesis, conceptually
replicating Study 1A-B. Moreover, low-income people were wrong to believe they were seen negatively: Their meta-perceptions were less accurate than those of high-income people, and they were not in fact seen any more negatively by others than high-income people were. All these effects were specific to income (but held across three different income measures) and did not emerge with education.

This study extends the findings from Study 1A-1B into a more realistic, ecologically valid setting, to a new population of participants, and to post-interaction meta-perceptions (rather than pre-interaction expected meta-perceptions). We consistently find that low SES people believe they are seen more negatively in terms of warmth and competence, even though they are stereotyped as being highly warm, and even when they are in live interactions where there are many other cues they could attend to that could drive their meta-perceptions.

However, in this study, we find these effects with income, an objective measure of SES that in Study 1A-1B was either not significantly related to meta-perceptions at all, or was related to competence but not warmth. One reason for this may be the increased power we obtained by having a larger sample size with more repeated measurements per participant. As well, the measure of warmth and competence we used in this study may be more sensitive than that used in previous studies, because it has more items, includes both positively and negatively valenced items, and uses ratings of warmth and competence for each item and is therefore sensitive to between-item differences. For these reasons, this study estimates the effect size with a much smaller margin of error than did previous studies. Indeed, the standardized effect sizes obtained in this study for objective measures are comparable to those from our previous studies. For example, among high warmth traits (1 SD above the mean), the relationship between income while growing up and meta-perceptions in this study was $\beta = .05$, $p < .001$; in Study 1A it was $\beta =$
.09, \( p = .209 \) and in Study 1B it was \( \beta = .03, \ p = .614 \). This suggests there may be a reliable but smaller effect linking objective SES with meta-perceptions, but that in Study 1A-1B we lacked the statistical power to find it. We address this issue with an internal meta-analysis after reporting data from all studies.

In the following studies, we test the consequences of these SES-linked meta-perceptions for attributions for negative feedback in warmth domains (Study 3A-3B) and in competence domains (Study 4A-4B).

**Study 3A-3B**

In these studies, we tested how participants would explain negative feedback we gave them about their warmth. Specifically, these studies test three hypotheses:

**Hypothesis 1:** Low SES people will have more negative meta-perceptions of both warmth and competence compared to high SES people.

**Hypothesis 2:** Low SES people will be more likely to attribute negative feedback in a warmth domain to internal causes compared to high SES people.

**Hypothesis 3:** The effect observed in Hypothesis 2 will be mediated by low SES people’s more negative meta-perceptions of warmth compared to high SES people.

In Study 3A, we explore whether these hypotheses are supported; in Study 3B we confirm them in a pre-registered replication (see https://osf.io/bf3jh/?view_only=ec8f6a36b61f46eaa0cf51df4369be9d for the pre-registration and study materials). Because the methods and results are very similar for both studies, we report them together, noting any differences.

**Methods**
Participants and sample size. We collected data from Amazon Mechanical Turk participants (Study 3A N = 198; Study 3B N = 296). We used the same eligibility requirements as in Study 1B. In addition, we screened out participants who failed one or more of three English comprehension questions at the beginning of the survey. We also excluded any participants who failed our attention check (Study 3A n = 18; Study 3B n = 25). The sample size was therefore 180 for Study 3A (69 male, mean age = 35.20, 80% White) and 271 for Study 3B (113 male, mean age = 35.98, 75% White). We also had exclusion criteria specific to each hypothesis; see details below.

Procedure. Participants first completed demographics questions, including SES measures. Subjective SES was our primary measure, pre-registered as such in Study 3B; this and our exploratory SES measures were identical to those used in Study 1B (except questions about parental education, which we did not include in this study). After this, they learned that they would be chatting via instant messaging with another participant who was online at the same time as them, and rated how they expected their partner to see them (their expected meta-perceptions). These were the same items as used in Study 1A-1B, but rephrased as “How _____ will your partner think you are?” We then informed them that after the first conversation, they would have a second conversation, and that both they and their partner would be given the choice to either chat with the same person again, or with a different person.

After this, participants chatted with their partner for three minutes (four minutes in Study 3B) via Chatplat, an online instant-messaging platform integrated into our Qualtrics survey (for examples of other studies using Chatplat, see Huang, Yeomans, Brooks, Minson, & Gino, 2017; Wolf, Lee, Sah, & Brooks, 2016). Participants then rated how they believed their partner saw them in the chat (post-conversation meta-perceptions), again using the same items as before, but
phrased as “How ____ did your partner think you are?”. We designated expected (rather than post-conversation) meta-perceptions as our primary measure, because we reasoned that as in previous research where people’s expectations for a task predict their attributions for failure on that task (e.g., Feather, 1969; Feather & Simon, 1971; Fitch, 1970), our participants’ expectations for the conversation would predict their attributions for negative feedback on the conversation. In any case, results are similar if we use post-conversation meta-perceptions instead.

Participants then indicated whether they would prefer to chat with the same person again for the second conversation, or with a different person. Following this, they learned that their partner chose to chat with a different person rather than chatting with them again. We considered this to be negative feedback about warmth, as it implies that their partner would prefer not to have a friendly conversation with them again. Participants then completed our primary dependent variable: why they thought their partner chose not to chat with them again – that is, their attributions for this negative feedback. Specifically, they rated how plausible different explanations were for why their partner did not choose them on a scale from 1 (this is probably not the reason they didn’t choose me) to 7 (this probably is the reason they didn’t choose me).

Three items attributed the negative feedback internally: “I wasn’t likeable enough”, “I wasn’t interesting enough”, and “I was too overbearing”. Four items attributed the negative feedback to the partner: “They were unfriendly”, “They were too shy”, “They don’t really get me”, and “They meant to pick me, but accidentally clicked the wrong button”. Finally, in Study 3B we changed the items slightly for attributions that blame one’s partner: We kept the last two items from Study 3A but replaced the first two with two new items, “They were interested in meeting new people” and “They didn’t have anything else interesting to talk about with me”.

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4 In Study 3B we changed the items slightly for attributions that blame one’s partner: We kept the last two items from Study 3A but replaced the first two with two new items, “They were interested in meeting new people” and “They didn’t have anything else interesting to talk about with me”.
3B only, we also included three items that attributed the negative feedback to external factors not specific to the partner: “There wasn’t enough time for us to get to know each other”, “We didn’t have much in common”, and “There was a technical issue with the chat that made it hard for us to get to know each other”. We averaged across items to create composite measures of internal attributions \( (\alpha = .67 \text{ in Study 3A, } .68 \text{ in Study 3B}) \), partner-blaming external attributions \( (\alpha = .58 \text{ in Study 3A, } .14 \text{ in Study 3B}) \), and other-blaming external attributions \( (\alpha = .18; \text{ included in Study 3B only}) \). Because the reliabilities are quite low, particularly for external attributions, we report analyses for both the composite and each item individually. Finally, we assessed participants’ suspicion (see below) and debriefed them.

**Exclusion criteria per hypothesis.** We used participants’ responses to these suspicion questions to exclude them from specific analyses where suspicion could affect our results. We pre-registered these exclusion criteria in Study 3B; results look similar or identical if we do not use them. Our first hypothesis was that low SES people would expect their chat partner to see them more negatively compared to high SES people. We therefore excluded any participants who were suspicious that this chat would not actually occur from the analyses for this hypothesis. We asked participants, “At the beginning of the study, when we told you that you would be chatting with another participant, were you skeptical that this chat might not occur? How skeptical were you?” Two coders read all responses and rated them as not at all skeptical, slightly skeptical, or very skeptical. The coders then discussed any disagreements and come to consensus. We excluded any participants from the analyses for this hypothesis if our coders rated them as very skeptical about the chat occurring (Study 3A \( n = 54 \); Study 3B \( n = 89 \)), so the final sample size for these analyses for Study 3A was 126 and for Study 3B was 182.
Our second hypothesis was that low SES people would be more likely than high SES people to attribute the negative warmth feedback internally. We therefore excluded any participants who were suspicious that their interaction partner had not actually made this choice. We asked participants, “Did you believe that your partner did not actually choose you? Please briefly explain why or why not”. The same two coders then read all responses and coded them in the same way as described above. We excluded any participants from the analyses for this hypothesis if they received a 2 for suspicion that their partner did not actually choose to reject them (Study 3A \( n = 44 \); study 3B \( n = 50 \)). We also excluded any participants whose chat did not work properly (e.g., they were never paired with a partner). Again, the same two coders read all transcripts from the chats. They rated the chat quality as acceptable or unacceptable, discussed any disagreements, and came to a consensus. We excluded any participants who had unacceptable chats (Study 3A \( n = 27 \); Study 3B \( n = 36 \)), so the final sample size for these analyses for Study 3A was 110 and for Study 3B was 185. Our third hypothesis was that meta-perceptions would mediate the relationship between SES and attributions for negative feedback, so we excluded any participants who were suspicious about the chat occurring or about the negative feedback or whose chats did not work properly, so the final sample size for these analyses for Study 3A was 86 and for Study 3B was 130 (some of the exclusions were overlapping).

**Results**

**Does SES predict meta-perceptions?** We ran separate linear regression models predicting participants’ expectations for how their conversation partner would see them in terms of warmth and competence with our primary SES measure (subjective SES) and our exploratory SES measures (see Table 8). Unexpectedly, and contrary to our previous findings, in Study 3A,
subjective SES was not significantly related to expected meta-perceptions of warmth or competence. However, in Study 3B, and in line with our previous findings, subjective low SES people did indeed expect others to see them as both colder and less competent in an online chat than high SES people did. As Study 3A is the only instance across all seven studies where we find no effect of subjective SES on meta-perceptions, the sample size in this study after exclusions was fairly small \( (N = 126) \), and our pre-registered replication study does find this effect, we tentatively treat this as a random fluctuation in our estimated effect size. We also return to this point in the discussion of Study 3A-3B and the internal meta-analysis. Next, we tested whether SES interacted with meta-perception dimension to predict meta-perceptions; it did not (see Table 2). This further supports the cold-and-incompetent hypothesis, as it suggests that low SES people expect to be seen similarly negatively across both warmth and competence.

Table 8

Regression analyses with SES predicting meta-perceptions, Study 3A-3B.

<table>
<thead>
<tr>
<th>Dependent variable (meta-perception dimension)</th>
<th>Predictor</th>
<th>Study 3A</th>
<th>Study 3B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>( b )</td>
<td>( SE_{b} )</td>
</tr>
<tr>
<td>Competence</td>
<td>Subjective SES</td>
<td>.10</td>
<td>.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warmth</td>
<td>Childhood income</td>
<td>.01</td>
<td>.05</td>
</tr>
<tr>
<td>Competence</td>
<td>Annual income</td>
<td>.09</td>
<td>.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warmth</td>
<td>Household income</td>
<td>-.02</td>
<td>.06</td>
</tr>
<tr>
<td>Competence</td>
<td>Education</td>
<td>.02</td>
<td>.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warmth</td>
<td></td>
<td>-.06</td>
<td>.05</td>
</tr>
</tbody>
</table>

Note: All models were run separately, and all include gender as a covariate (effect coded so \(-1 = \) female, \(1 = \) male).

We also explored whether subjective SES was related to participants’ beliefs about how their partner saw them after the conversation. In Study 3A it was not; in Study 3B, it was
positively related to post-conversation meta-perceptions of warmth and competence (see Appendix: Supplemental Table 6 for more details). Thus, in Study 3B, people who felt relatively lower-class both expected their chat partner would see them negatively before the conversation occurred, and believed this is what had happened after the conversation occurred. Our exploratory SES measures were largely unrelated to meta-perceptions (see Table 8).

**Does SES predict internal attributions?** We ran separate linear regression models predicting internal and external attributions with our primary SES measure (see Table 9 and Figure 3). As expected, in both studies, subjective SES was significantly negatively related to our composite measure of internal attributions, meaning that people with lower SES were more likely to blame themselves for being rejected. Subjective SES was unrelated to external attributions (blaming one’s partner or blaming other factors). Because the measures we created had low reliability, we also examined the relationship between SES and each internal and external attribution item separately (see Table 9). SES was significantly and negatively related to two of the three internal attribution items; in contrast, SES was unrelated to all items for external attributions that blame one’s partner, and all but one item for external attributions that blame other factors (these items were only present in Study 3B). Specifically, high SES people were significantly more likely to agree that they were not chosen by their partner because there was a technical issue with the chat – even though we removed all participants who actually had technical issues with their chats from this analysis.

Next, we assessed whether the relationship between SES and attribution differed based on whether the attribution was external or internal. Due to an oversight we did not pre-register this analysis; however, it seems a critical test of our hypothesis to show that SES has a more negative relationship with internal, compared to external, attributions. We ran a multilevel
regression analysis in R predicting attributions with attribution type (effect coded so -1 = external, 1 = internal), subjective SES (centered), their interaction, and random intercepts for participants. In both studies, attribution type interacted significantly with SES (Study 3A: $b = -0.11, p = .008$; Study 3B: $b = -0.08, p = .002$). Specifically, low SES people were more likely than high SES people to attribute negative feedback internally, but equally likely to attribute negative feedback externally (see Figure 3).

**Do warmth meta-perceptions mediate the relationship between SES and internal attributions?** We used the PROCESS macro in SPSS (Hayes, 2017) to bootstrap 10,000 samples to test for an indirect effect of subjective SES on internal attributions through warmth meta-perceptions\(^5\) (see Table 10). This indirect effect was not significant in Study 3A (which is unsurprising, considering that we observed no relationship between SES and meta-perceptions, as noted above). In Study 3B, subjective SES was positively related to warmth meta-perceptions, which in turn were negatively related to internal attributions. However, the 95% confidence interval for this effect narrowly included 0 (and the 90% confidence interval did not include 0, $\beta = -0.03$, 90% CI [-0.07, -0.002]) indicating that this effect was only marginally significant.

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\(^5\) In our pre-registered analysis, we indicated that we would use a composite of all three meta-perception types. Subsequently we realized that our theoretical reasoning required us to instead test for mediation with warmth meta-perceptions specifically: We reasoned that low SES people would blame themselves more for failure in a warmth domain because of their *warmth* meta-perceptions. Nonetheless, we conducted our preregistered analysis, and found if we do use our planned analysis, with a composite measure of both meta-perception types, we find a similarly-sized, and fully significant, indirect effect, $b = -0.05, \beta = -0.04$, 95% CI[$-0.09$, -0.005].
Figure 3

*SES negatively predicts internal attributions, but is unrelated to external attributions, for negative feedback in a warmth domain.*

*Note:* A small amount of random noise is added to subjective SES to make it easier to see these points.
Table 9

Regression analyses with SES predicting attributions, Study 3A-3B.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Study 3A</th>
<th></th>
<th>Study 3B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>SE b</td>
<td>β</td>
<td>t</td>
</tr>
<tr>
<td>Internal attribution composite</td>
<td>-.22</td>
<td>.08</td>
<td>-.25</td>
<td>-2.62</td>
</tr>
<tr>
<td>“I wasn’t likeable enough”</td>
<td>-.23</td>
<td>.11</td>
<td>-.20</td>
<td>-2.15</td>
</tr>
<tr>
<td>“I wasn’t interesting enough”</td>
<td>-.30</td>
<td>.12</td>
<td>-.24</td>
<td>-2.52</td>
</tr>
<tr>
<td>“I was too overbearing”</td>
<td>-.16</td>
<td>.09</td>
<td>-.17</td>
<td>-1.77</td>
</tr>
<tr>
<td>External partner attribution composite</td>
<td>-.01</td>
<td>.06</td>
<td>-.02</td>
<td>-2.23</td>
</tr>
<tr>
<td>“They were unfriendly”</td>
<td>.03</td>
<td>.08</td>
<td>.04</td>
<td>.42</td>
</tr>
<tr>
<td>“They were too shy”</td>
<td>-.11</td>
<td>.08</td>
<td>-.13</td>
<td>-1.36</td>
</tr>
<tr>
<td>“They don’t really get me”</td>
<td>.04</td>
<td>.09</td>
<td>.04</td>
<td>.45</td>
</tr>
<tr>
<td>“They meant to pick me but accidentally clicked the wrong button”</td>
<td>-.09</td>
<td>.08</td>
<td>-.11</td>
<td>-1.17</td>
</tr>
<tr>
<td>“They were interested in meeting new people”</td>
<td>.01</td>
<td>.08</td>
<td>.01</td>
<td>.09</td>
</tr>
<tr>
<td>“They didn’t have anything else interesting to talk about with me”</td>
<td>-.09</td>
<td>.09</td>
<td>-.07</td>
<td>-.99</td>
</tr>
<tr>
<td>External other attribution composite</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“There wasn’t enough time for us to get to know each other”</td>
<td>.04</td>
<td>.05</td>
<td>.07</td>
<td>.94</td>
</tr>
<tr>
<td>“We didn’t have much in common”</td>
<td>-.03</td>
<td>.09</td>
<td>-.02</td>
<td>-.33</td>
</tr>
<tr>
<td>“There was a technical issue with the chat that made it hard for us to get to know each other”</td>
<td>.09</td>
<td>.04</td>
<td>.17</td>
<td>2.26</td>
</tr>
</tbody>
</table>

Note: All models were run separately (i.e., with only one dependent variable at a time), and all include gender as a covariate (effect coded so -1 = female, 1 = male). Subjective SES was the independent variable for all models. Not all items were included in all studies (hence the missing values in some cells).
Table 10

*Mediation analyses testing whether meta-perceptions mediate the relationship between SES and internal attributions for rejection, Study 3A-4B.*

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>a</th>
<th>b</th>
<th>β</th>
<th>p</th>
<th>a*b</th>
<th>b</th>
<th>β</th>
<th>p</th>
<th>95% CIb</th>
<th>c</th>
<th>b</th>
<th>β</th>
<th>p</th>
<th>c'</th>
<th>b</th>
<th>β</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>3A</td>
<td>86</td>
<td>.07</td>
<td>.10</td>
<td>.382</td>
<td>-.08</td>
<td>-.06</td>
<td>.556</td>
<td>-.01</td>
<td>-.01</td>
<td>[-.06, .03]</td>
<td>-.22</td>
<td>-.25</td>
<td>.022</td>
<td>.22</td>
<td>-.24</td>
<td>.027</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3B</td>
<td>130</td>
<td>.17</td>
<td>.17</td>
<td>.005</td>
<td>-.23</td>
<td>-.20</td>
<td>.031</td>
<td>-.04</td>
<td>-.03</td>
<td>[-.08, .003]</td>
<td>-.13</td>
<td>-.11</td>
<td>.064</td>
<td>.09</td>
<td>-.08</td>
<td>.196</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4A</td>
<td>140</td>
<td>.20</td>
<td>.35</td>
<td>&lt;.001</td>
<td>-.34</td>
<td>-.24</td>
<td>.008</td>
<td>-.07</td>
<td>-.08</td>
<td>[-.16, -.01]</td>
<td>-.19</td>
<td>-.22</td>
<td>.009</td>
<td>-.12</td>
<td>-.14</td>
<td>.112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4B</td>
<td>143</td>
<td>.21</td>
<td>.33</td>
<td>&lt;.001</td>
<td>-.11</td>
<td>-.08</td>
<td>.359</td>
<td>-.02</td>
<td>-.03</td>
<td>[-.10, .04]</td>
<td>-.05</td>
<td>-.06</td>
<td>.449</td>
<td>-.03</td>
<td>-.03</td>
<td>.683</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note:* The independent variable for all these analyses is subjective SES. All models include gender as a covariate. The mediator is warmth meta-perceptions for Study 3A-3B and competence meta-perceptions for Study 4A-4B.
Discussion

In these studies, we explored the downstream consequences of low SES people’s more negative expectations for how others see them. We found, as predicted, that low SES people are more likely to blame themselves than high SES people are when they receive negative feedback about their warmth. That is, when low SES people discover that their partner chose not to interact with them, they are more likely than high SES people are to agree that it is plausible their partner did not choose them because they were unlikeable, uninteresting, or overbearing. We also found, in our larger, pre-registered study, that these internal attributions were related to meta-perceptions. Specifically, low SES people expected their conversation partners to view them as less warm than high SES people did, and these negative expectations in turn predicted their belief that they were not chosen by their partner because they had not acted warmly enough.

We also replicated the pattern we found in previous studies, where low SES people expect others to see them as both colder and less competent than high SES people, in Study 3B. This, in combination with the previous studies, shows that low SES people reliably have more negative meta-perceptions across a variety of methods, from imaginary interactions to in-person interactions to short online conversations. In Study 3A, however, for the first time we found no relationships between SES and meta-perceptions. This may have been due to the small sample size we used for this exploratory study, particularly after excluding all suspicious participants. The average correlation we observed in Study 1A-1B between subjective SES and meta-perceptions was $r = .23$. Across the seven studies we report here, we had 92% power on average to detect an effect of this size. This means that there is only a 56% chance ($0.92^7$) that we would find significant results all seven times (Schimmack, 2012). It is therefore not particularly
surprising that one of our seven studies failed to obtain the effect that we observe in all other
studies. We return to this in the internal meta-analysis.

**Study 4A-4B**

In Study 4A-4B, we again tested how participants would explain negative feedback we
gave them, and tested similar hypotheses as in Study 3A-3B, but this time the feedback was
about their competence. In Study 4A, we explored whether these hypotheses are supported; in
Study 4B we confirmed them in a pre-registered replication (see
https://osf.io/xyqhd/?view_only=40153476064745378bdc800ebaa5cbb for the pre-registration
and study materials).

**Method**

**Participants and sample size.** We collected data from MTurk participants using the
same eligibility criteria as in previous studies (in both studies, \( N = 299 \)). We excluded any
participants who failed our attention check (in both studies, \( n = 21 \)). We also removed two
participants from Study 3A who reported their gender as non-binary (because, as in all other
studies, we planned to control for gender). The sample size was therefore 276 for Study 3A (116
male, mean age = 36.58, 75% White) and 278 for Study 3B (115 male, mean age = 35.82, 77% 
White). As in Study 3A-3B, we also had specific exclusion criteria specific to each hypothesis;
see details below.

**Procedure.** The procedure was similar to that of Study 3A-3B. The key difference was
that we told participants (before their first online interaction) that the second interaction would
be a problem-solving task they would work on with their partner, involving skills like logical
reasoning, pattern recognition, and math. We also told them that for this reason, in the first
interaction, they should talk about their skills, abilities, and problem-solving strategies. This
meant that, when participants learned that their partner chose to speak to a different person on the second task rather than talking to them again, this implied that their partner would prefer to complete the problem-solving task with someone else than with them – in other words, that their partner did not find them competent.

We also altered our attribution items to correspond to this competence context. To measure internal attributions, we used the following items: “I didn’t talk enough about my skills”, “I didn’t show how proficient I would be at problem-solving tasks”, “I didn’t say anything clever”, and “I didn’t make enough intelligent comments” ($\alpha = .81$). To measure external attributions that blamed one’s partner, we used the following: “They didn’t recognize my talent”, “They didn’t understand that I am well-versed in this kind of task”, and “They wanted to work with someone else because they wanted to meet a new person” ($\alpha = .56$). Finally, to measure external attributions that blamed other factors, we used the following: “There wasn’t enough time for us to talk about our skills”, “There was a technical issue with the chat that made it hard for us to find out about each other’s abilities”, and “We had different problem-solving techniques so we probably wouldn’t work together well” ($\alpha = .31$). Again, because the reliabilities for external attributions are quite low, we report analyses for both the composites and each item individually.

Finally, we made one additional minor change to the survey. Following our results from Study 2, and our exploratory findings from Study 3A-B, we were interested in further testing the effect of SES on meta-accuracy. We therefore asked participants to report their perceptions of each other after their conversations. For the sake of brevity, in Study 4A, we randomly assigned half of the items for each meta-perception dimension to appear as post-conversation meta-perceptions, and half of the items to appear as post-conversation perceptions of one’s partner.
(phrased as “How ____ did you think he/she is?”). The perception and meta-perception items occurred in random order. In Study 4B, we instead simply included all items for both perceptions and meta-perceptions. The only other difference in methods between Study 4A and 4B was that in Study 4B, we also assessed self-esteem (M. Rosenberg, 1965) before measuring participants’ demographics. We did this to test whether our effects held controlling for self-esteem (see General Discussion for more on this issue).

**Exclusion criteria per hypothesis.** As in Study 3A-3B, we also used participants’ suspicion and chat quality as exclusion criteria when relevant to our hypotheses. Again, results look similar or identical without these exclusion criteria. However, we made one change to our exclusion criteria to ensure that we would have a larger sample for this study: We planned not to exclude participants who were suspicious that the chat would occur from our analyses for Hypothesis 1. We reasoned that in Study 1A-B, subjective SES predicted meta-perceptions even in an imaginary interaction, so even if participants did not believe they would really have an interaction, they likely answered our meta-perception questions the same way that participants in Study 1A-B did – as though it was a hypothetical interaction. Consistent with this idea, the effects from Study 3A-3B were not substantively different when we dropped this exclusion criterion. Therefore, in Study 4A-B, we retained participants who thought the chat might not occur to conserve statistical power.

Otherwise our exclusion criteria were the same as in Study 3A-3B. For testing whether SES predicted participants’ attributions for negative feedback, and whether meta-perceptions mediated this effect, we removed participants whose chats did not work properly (Study 4A \( n = 50 \); Study 4B \( n = 44 \)) and participants who were suspicious about having been rejected by their
partners (Study 4A \( n = 86 \); Study 4B \( n = 91 \)). The final sample size for these analyses was therefore 140 for Study 4A and 143 for Study 4B.

**Results**

**Does SES predict meta-perceptions?** We ran separate linear regression models predicting participants’ expectations for how their partner would see them in terms of warmth and competence with our primary SES measure (subjective SES) and our exploratory SES measures (see Table 11). As expected, subjective SES positively predicted expected meta-perceptions of warmth and competence, supporting the cold-and-incompetent hypothesis. Again, this effect did not differ significantly across the two meta-perception dimensions (see Table 2), further supporting the cold-and-incompetent hypothesis. Furthermore, in Study 4B where we measured self-esteem, subjective SES continued to predict both dimensions of meta-perceptions, above and beyond the effect of self-esteem (see Table 11). Annual income, household income, and education were all positively related to meta-perceptions of competence (the relationship with annual income was significant in both studies; the relationships with household income and education were significant in Study 4B but marginal in Study 4A). As well, in Study 4B (but not Study 4A), annual income and household income were both also positively and significantly related to meta-perceptions of warmth. Subjective SES was also positively related to post-conversation meta-perceptions of both warmth and competence (see Appendix: Supplemental Table 6). Thus, as in Study 3B, people who felt relatively lower-class both expected to be seen negatively before the conversation occurred, and believed they actually were seen negatively after the conversation occurred.
Table 11

Regression analyses with SES predicting meta-perceptions, Study 4A-4B.

<table>
<thead>
<tr>
<th>Dependent variable (meta-perception dimension)</th>
<th>Predictor</th>
<th>Study 4A</th>
<th></th>
<th></th>
<th>Study 4B</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence</td>
<td>Subjective SES</td>
<td>.18</td>
<td>.03</td>
<td>.31</td>
<td>5.34</td>
<td>&lt;.001</td>
<td>.21</td>
</tr>
<tr>
<td>Warmth</td>
<td>.15</td>
<td>.03</td>
<td>.26</td>
<td>4.44</td>
<td>&lt;.001</td>
<td>.15</td>
<td>.04</td>
</tr>
<tr>
<td>Competence</td>
<td>Childhood income</td>
<td>.02</td>
<td>.04</td>
<td>.03</td>
<td>.51</td>
<td>.614</td>
<td>.05</td>
</tr>
<tr>
<td>Warmth</td>
<td>.01</td>
<td>.04</td>
<td>.01</td>
<td>.21</td>
<td>.832</td>
<td>-.01</td>
<td>.04</td>
</tr>
<tr>
<td>Competence</td>
<td>Annual income</td>
<td>.10</td>
<td>.03</td>
<td>.18</td>
<td>2.92</td>
<td>.004</td>
<td>.20</td>
</tr>
<tr>
<td>Warmth</td>
<td>.05</td>
<td>.03</td>
<td>.10</td>
<td>1.54</td>
<td>.124</td>
<td>.12</td>
<td>.03</td>
</tr>
<tr>
<td>Competence</td>
<td>Household income</td>
<td>.06</td>
<td>.04</td>
<td>.10</td>
<td>1.68</td>
<td>.094</td>
<td>.12</td>
</tr>
<tr>
<td>Warmth</td>
<td>.02</td>
<td>.04</td>
<td>.03</td>
<td>.50</td>
<td>.617</td>
<td>.07</td>
<td>.03</td>
</tr>
<tr>
<td>Competence</td>
<td>Education</td>
<td>.10</td>
<td>.05</td>
<td>.12</td>
<td>1.95</td>
<td>.053</td>
<td>.21</td>
</tr>
<tr>
<td>Warmth</td>
<td>.03</td>
<td>.05</td>
<td>.04</td>
<td>.60</td>
<td>.553</td>
<td>.08</td>
<td>.05</td>
</tr>
</tbody>
</table>

Note: All models were run separately, and all include gender as a covariate (effect coded so -1 = female, 1 = male).

We also tested whether subjective SES was related to meta-accuracy by assessing whether the relationship between how participants believed they were seen by their partner and how their partner actually saw them was stronger at different levels of SES. We ran multilevel regression analyses predicting participants’ meta-perceptions with their subjective SES, their partners’ perceptions of them, a term for the interaction of partners’ perceptions by participants’ SES, and random intercepts for dyads. There was no interaction between perceptions and SES in either study, and these (nonsignificant) interactions were in the opposite direction to the interaction in Study 2 (Study 4A $b = -.01, p = .743$; Study 4B $b = -.02, p = .105$). These effects
are contrary to Study 2, where we found that low SES people’s meta-perceptions were overly pessimistic; we return to this point in the General Discussion and internal meta-analysis.

**Does SES predict attributions?** We ran separate linear regression models predicting internal attributions, external attributions to one’s partner, and external attributions to other factors with our primary SES measure (see Table 12 and Figure 4). In Study 4A, as expected, subjective SES was negatively related to our composite measure of internal attributions and unrelated to our composite measure of external attributions. The pattern of associations with individual items was similar, and a multilevel regression analysis in R predicting attributions with attribution type (effect coded so -1 = external, 1 = internal), subjective SES (centered), their interaction, and random intercepts for participants found a significant interaction, $b = -.13$, $p < .001$. In other words, people with lower SES were more likely to blame themselves for being rejected, compared to people with higher SES.

In Study 4B we found a conceptually similar result, but with a different pattern. We again found a significant interaction, $b = -.08$, $p = .014$, such that higher SES participants, relative to lower SES participants, made more self-serving attributions. However, instead of making fewer internal attributions, they instead made (marginally) more partner-external attributions. The pattern over individual items was similar. This was not what we expected based on the results of Study 4A, but this interaction is still consistent with our theory: Low SES people blamed themselves more and external factors less, compared to high SES people.
Figure 4

Low SES people blame themselves more and external factors less than high SES people for negative feedback in a competence domain.

Note: A small amount of random noise is added to subjective SES to make it easier to see these points.
Table 12

Regression analyses with SES predicting attributions, Study 4A-4B.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Study 4A</th>
<th>Study 4B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>SE</td>
</tr>
<tr>
<td>Internal attribution composite</td>
<td>-.19</td>
<td>.07</td>
</tr>
<tr>
<td>“I didn’t talk enough about my skills”</td>
<td>-.20</td>
<td>.09</td>
</tr>
<tr>
<td>“I didn’t show how proficient I would be at problem-solving tasks”</td>
<td>-.24</td>
<td>.09</td>
</tr>
<tr>
<td>“I didn’t say anything clever”</td>
<td>-.19</td>
<td>.09</td>
</tr>
<tr>
<td>“I didn’t make enough intelligent comments”</td>
<td>-.12</td>
<td>.10</td>
</tr>
<tr>
<td>External partner attribution composite</td>
<td>.05</td>
<td>.06</td>
</tr>
<tr>
<td>“They didn’t recognize my talent”</td>
<td>.09</td>
<td>.09</td>
</tr>
<tr>
<td>“They didn’t understand that I am well-versed in this kind of task”</td>
<td>-.05</td>
<td>.10</td>
</tr>
<tr>
<td>“They wanted to work with someone else because they wanted to meet a new person”</td>
<td>.12</td>
<td>.10</td>
</tr>
<tr>
<td>External other attribution composite</td>
<td>.08</td>
<td>.06</td>
</tr>
<tr>
<td>“There wasn’t enough time for us to talk about our skills”</td>
<td>.08</td>
<td>.10</td>
</tr>
<tr>
<td>“There was a technical issue with the chat that made it hard for us to find out about each other’s abilities”</td>
<td>.14</td>
<td>.07</td>
</tr>
<tr>
<td>“We had different problem-solving techniques so we probably wouldn’t work together well”</td>
<td>.04</td>
<td>.10</td>
</tr>
</tbody>
</table>

Note: All models were run separately (i.e., with only one dependent variable at a time), and all include gender as a covariate (effect coded so -1 = female, 1 = male). Subjective SES was the independent variable for all models.
Do competence meta-perceptions mediate the relationship between SES and internal attributions? We used the PROCESS macro in SPSS (Hayes, 2017) to bootstrap 10,000 samples to test for an indirect effect of class on internal attributions through competence meta-perceptions (see Table 10). In this analysis, SES positively predicted competence meta-perceptions (significantly in both studies), which in turn negatively predicted internal attributions (significantly in Study 4A; nonsignificantly in Study 4B). In Study 4A, the overall indirect effect was significant, and competence meta-perceptions fully mediated the effect of subjective SES on internal attributions; in Study 4B, the overall indirect effect was nonsignificant.

Discussion

In this study we extended the results from Study 3A-3B to a competence domain and found parallel results: People who believed they were lower on the socioeconomic hierarchy – relative to those who believed they were higher – blamed themselves more, or external factors less, when they were told that their partner chose not to work with them on a competence task. Additionally, in Study 4A, this effect was mediated by their expectations that they would be perceived as less competent by their partner. We also replicated our findings from the previous studies, again supporting the cold-and-incompetent hypothesis.

Internal Meta-Analysis

Across our studies, people with low subjective SES consistently thought they were, or would be, seen more negatively in terms of both warmth and competence. However, this pattern did not replicate in Study 3A. As well, results with objective SES were less consistent. We also tested whether these negative meta-perceptions led low SES people to internally attribute negative feedback in warmth (Study 3A-3B) and competence (Study 4A-4B) domains. In three of the four studies (Study 3A-4A), low SES people were indeed more likely to internally
attribute negative feedback, and in two of the four studies (Study 3B-4A), this was related to their negative meta-perceptions. Finally, SES predicted meta-accuracy in Study 2, but not in Study 4A-4B. We attributed these inconsistencies in our results to low power. To determine whether these effects were robust when data from all studies was included, we conducted an internal meta-analysis.

**Results**

*Analytic approach.* For each meta-analysis we conducted, we extracted the standardized regression coefficient and its standard error for the relationship we were interested in. We used the metafor package in R (Viechtbauer, 2015) to run fixed-effects models assessing the meta-analytic effect sizes.

*Meta-perceptions.* First, we examined the relationship between each SES measure and meta-perceptions, controlling for gender (because we planned to control for gender in each individual study). We meta-analyzed all SES measures except parental education, because that measure was only included in three of the seven studies. For Study 2, because we did not have direct measures of participants’ warmth and competence meta-perceptions, we instead used the simple effect of the relationship between SES and meta-perceptions on traits rated as high (1 SD above the mean) in warmth and competence. Subjective SES, childhood income, annual income, and household income were all significantly and positively related to meta-perceptions of both warmth and competence (see Figure 5), supporting the cold-and-incompetent hypothesis. Only education was related to meta-perceptions of competence but not warmth. The effect of subjective SES was much larger than the effect with any of the objective measures. This suggests that objective SES measures were inconsistently related to meta-perceptions within each study because our studies were underpowered to detect these smaller effects – not because these effects

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did not exist. However, these effects were much smaller than with subjective SES, and emerged inconsistently across studies, so these results should not be taken as definitive evidence for these effects.

Figure 5

*Forest plots for meta-analyzed effect of SES on meta-perceptions.*

<table>
<thead>
<tr>
<th>Subjective SES predicting competence meta-perceptions</th>
<th>Subjective SES predicting warmth meta-perceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 1A</td>
<td>0.26 [0.13, 0.40]</td>
</tr>
<tr>
<td>Study 1B</td>
<td>0.21 [0.09, 0.32]</td>
</tr>
<tr>
<td>Study 3A</td>
<td>0.14 [-0.03, 0.32]</td>
</tr>
<tr>
<td>Study 3B</td>
<td>0.24 [0.09, 0.38]</td>
</tr>
<tr>
<td>Study 4A</td>
<td>0.27 [0.16, 0.38]</td>
</tr>
<tr>
<td>Study 4B</td>
<td>-0.33 [0.22, 0.45]</td>
</tr>
</tbody>
</table>

$p < .001$  

<table>
<thead>
<tr>
<th>Childhood income predicting competence meta-perceptions</th>
<th>Childhood income predicting warmth meta-perceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 1A</td>
<td>0.19 [0.05, 0.33]</td>
</tr>
<tr>
<td>Study 1B</td>
<td>0.06 [-0.06, 0.17]</td>
</tr>
<tr>
<td>Study 2</td>
<td>0.05 [0.02, 0.07]</td>
</tr>
<tr>
<td>Study 3A</td>
<td>0.03 [-0.15, 0.21]</td>
</tr>
<tr>
<td>Study 3B</td>
<td>-0.05 [-0.19, 0.10]</td>
</tr>
<tr>
<td>Study 4A</td>
<td>0.04 [-0.08, 0.15]</td>
</tr>
<tr>
<td>Study 4B</td>
<td>0.09 [-0.03, 0.21]</td>
</tr>
</tbody>
</table>

$p < .001$  

β
Note: Not all SES measures appeared in all studies, so not all forest plots include all studies. Larger points for the individual studies indicate more precise estimates.
**Attributions.** Second, we examined each path in the mediation models from Study 3A-4B (again, controlling for gender, as planned in each individual study). As hypothesized, people with lower subjective SES were more likely to attribute negative feedback internally, and this effect was partially mediated by their less positive meta-perceptions (see Figure 6). The meta-analytic indirect effect was significant, again suggesting that our inconsistent results can be attributed to lack of power rather than lack of effect.

Figure 6

*Meta-analyzed mediation model, Study 3A-4B.*

\[\beta = .24, p < .001\]

\[\beta = -.15, p = .001\]

\[\beta = -.15, p < .001\]

\[\beta = -.11, p = .008\]

Indirect effect: \[\beta = -.03, p = .029\]

**Accuracy.** Third, we examined the relationship between SES and meta-perception accuracy in Study 2 and 4A-4B (that is, the interaction term between perceptions and SES predicting meta-perceptions). We used the interaction term with subjective SES for Study 4A-4B, because that was our primary SES measure in those studies. For Study 2, we did not have a primary SES measure. We therefore ran three separate models, using the interaction between perceptions and subjective SES measures for Study 4A-4B, combined with childhood, annual, or household income for Study 2. In all three models, there was a significant positive effect, such that low SES people’s meta-perceptions were less accurate (see Figure 7).
**Meta-analyzed meta-accuracy.**

<table>
<thead>
<tr>
<th>Meta-accuracy using childhood income in Study 2</th>
<th>Meta-accuracy using annual income in Study 2</th>
<th>Meta-accuracy using household income in Study 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 2</td>
<td>Study 2</td>
<td>Study 2</td>
</tr>
<tr>
<td>Study 4A</td>
<td>Study 4A</td>
<td>Study 4A</td>
</tr>
<tr>
<td>Study 4B</td>
<td>Study 4B</td>
<td>Study 4B</td>
</tr>
</tbody>
</table>

\[
\begin{array}{c|c}
\text{Effect Size} & \text{Confidence Interval} \\
\hline
0.01 [-0.00, 0.02] & 0.02 [-0.01, 0.03] & 0.05 [-0.04, 0.06] \\
-0.01 [-0.14, 0.12] & -0.01 [-0.14, 0.12] & -0.01 [-0.14, 0.12] \\
-0.04 [-0.08, 0.01] & -0.04 [-0.08, 0.01] & -0.04 [-0.08, 0.01] \\
\hline
p = .040 & p < .001 & p < .001 \\
\end{array}
\]

*Note: All three models use the interaction term between subjective SES and perceptions as the effect size for Study 4A-4B. The only difference between the three models is which SES measure is used in the interaction term for the effect size for Study 2.*

**Discussion**

Despite mixed results in some studies, our internal meta-analysis revealed unambiguous support for the cold-and-incompetent hypothesis: Across both subjective and objective SES measures, low SES people expected others would (or did) see them as colder and less competent than high SES people did. The only SES measure that did not exhibit this pattern was education, where less-educated people believed others would (or did) see them as less competent, but equally warm, compared to more-educated people. However, the relationship between SES and meta-perceptions was much larger for subjective SES than any objective measures of SES (as we tentatively suggested in the introduction). Household income in particular was very inconsistently related to meta-perceptions, and its meta-analytic effect size was small with a 95% confidence interval very close to 0, so these results should be interpreted with caution. We also meta-analyzed results from Study 3A-4B to test the relationship between SES, meta-perceptions, and people’s explanations for negative feedback. As hypothesized, low SES people were more
likely to blame themselves when they received negative feedback, and this was mediated by their more negative expectations for how their conversation partner would see them. Finally, across studies, SES people were less accurate in their assessments of how others saw them.

Some authors have criticized internal meta-analyses on the grounds that they amplify p-hacked results (Vosgerau, Simonsohn, Nelson, & Simmons, 2018). However, many of our studies are pre-registered. Furthermore, our studies that are not pre-registered generally use the same exclusion criteria and data analysis techniques as our pre-registered studies. We therefore had little flexibility in data analysis and reporting. Our meta-analysis should therefore be a trustworthy representation of the data. Overall, this meta-analysis shows that, despite some inconsistencies in our results when examining individual studies, when taken as a whole, our hypotheses receive robust empirical support.

General Discussion

Across seven studies, three of them pre-registered, people’s subjective sense of their position in the socioeconomic hierarchy predicted how they expected to be seen by others. Specifically, those who felt relatively low in SES, compared to those who felt relatively high in SES, expected to be seen – and believed they really were seen – more negatively by others, in terms of both warmth and competence. This occurs in diverse contexts, including hypothetical situations where people imagine meeting a stranger for the first time (Study 1A-1B) and real situations where people interact with one another in-person (Study 2) or online via instant-messaging (Study 3A-4B). In addition, in Study 1B, we found that these effects are mediated by the mechanisms that we theoretically expected to be responsible for this effect: Low SES people have less positive views of themselves, and expect to present themselves less positively,
compared to high SES people, and these factors in turn predict less positive expectations of how they will be seen by others across domains.

These meta-perceptions may have consequences for internal attributions for failure in both warmth and competence domains. Specifically, when low SES people discover they were rejected based on perceived lack of either warmth (Study 3A-3B) or competence (Study 4A-4B), they are more likely to blame themselves for this negative feedback, compared to high SES people, and this effect is mediated by more negative meta-perceptions of warmth (Study 3A-3B) or competence (Study 4A-4B). Our findings in these latter studies were not entirely consistent: In Study 4B SES was unrelated to internal attributions, and in Study 3A and 4B meta-perceptions were unrelated to internal attributions. However, our internal meta-analysis found that after aggregating the data for Study 3A-4B, low SES people were indeed more likely to make internal attributions, and this was indeed mediated by their more negative meta-perceptions.

This robust support for the cold-and-incompetent hypothesis occurs even though low SES people are frequently stereotyped as less competent but warmer than high SES people (e.g., Durante et al., 2014, 2017); this was the basis for our alternative warm-but-incompetent hypothesis. Some researchers have argued that these ambivalent stereotypes justify and maintain inequality: If a low-status group is incompetent, then their low status seems deserved; if they are also warm, then it seems that “no one group has it all”, because low-status groups are compensated for their low competence with high warmth (Durante & Fiske, 2017; Jost & Kay, 2005; Kay & Jost, 2003). One might hope that there might be a silver lining to these inequality-maintaining stereotypes, where low-status group members could at least expect to be seen positively in one domain. Our data belies this, instead showing that low-SES people expect to be seen negatively across both domains, despite the positive stereotype of their warmth. This also
occurs across both the sociability and morality facets of warmth. Despite research showing that low SES people tend to be more moral (e.g., Kraus & Callaghan, 2016; Piff et al., 2010; Piff & Robinson, 2017), they do not expect to be perceived that way.

**Are Low SES People Right to Believe They Will Be Seen Negatively?**

One possible way to reconcile our findings with findings that low SES people are stereotyped as warm but incompetent (Durante et al., 2014, 2017; Durante & Fiske, 2017) might be to posit that, although people endorse ambivalent stereotypes in self-report surveys, when they actually encounter low SES people in real life, they perceive them unambivalently negatively. In other words, it might be that low SES people really are seen more negatively by others across domains, and low SES people themselves are simply aware of that reality. However, our data suggest that this is not the case. Rather, on the balance we find that low SES people are inaccurate in their expectations for how they will be seen.

In Study 2, we analyzed meta-accuracy, or how well people’s beliefs about how they were seen align with how others actually saw them after real live interactions. We found that low SES people were less accurate than high SES people, and that low SES people were perceived to be equally warm and competent as high SES people. Although we did not find this pattern in Study 4A-4B, where we also assessed meta-accuracy, the results from Study 2 are a far more highly-powered test, as we had over 500 participants each make 12 meta-perception ratings for each interaction they had with the other people in their group (typically 5-6); in comparison, Study 4A-4B both had fewer than 200 participants each make 6 (Study 4A) or 12 (Study 4B) meta-perception ratings for only the single interaction they had with their partner. The results from Study 2 should therefore be weighed more heavily. Moreover, meta-accuracy in Study 4A-4B overall was quite low – it seems to be difficult to accurately understand how one was
perceived after a four-minute online chat. This may have reduced our ability to detect moderation in meta-accuracy by SES. Furthermore, our meta-analysis showed that after aggregating across the data from Study 2 and Study 4A–4B, low SES people were less accurate in their meta-perception across studies. Taken together, this evidence suggests that low SES people’s chronically negative meta-perceptions may be overly pessimistic.

These inaccurate and negative meta-perceptions may inhibit low SES individuals from taking opportunities, both interpersonally and professionally. As we have demonstrated, low SES individuals are more likely to blame themselves when they receive negative feedback, whereas high SES individuals eschew responsibility for failure, even blaming their rejection on technical problems with the survey where none existed. This tendency to internally attribute failure may make low SES individuals less likely to persist, as they may come to believe that they lack the skills and talents needed to achieve their goals (Weiner, 1985, 2004). For example, women who tend to internally attribute failure are also less likely to persist in engineering (Nauta, Epperson, & Waggoner, 1999). In contrast, high SES people may be less impacted by failure, reasoning that it is not their fault that they performed poorly. In turn, they may be more likely to try again. This increased persistence may thereby increase high SES people’s likelihood of success in both warmth and competence domains, compounding their material advantages.

**Limitations and Future Directions**

The effects we report here, while present for both subjective perceptions of one’s socioeconomic rank and one’s objective resources, are larger and more consistent with subjective than objective measures. This is not entirely unexpected, as both the mechanisms we outlined for the cold-and-incompetent hypothesis – self-views and self-presentation expectations – are more strongly tied to subjective perceptions of one’s status compared to others’ than they are to
objective indicators of SES. In Study 2, our most highly-powered study, where participants chatted with one another in live interactions, we do find that objective indicators of SES are related to meta-perceptions. This effect also emerges in our meta-analysis with all three income measures, suggesting that our other studies, where this effect was less consistent, were not sufficiently powered to detect this effect.

More broadly, these findings contribute to emerging theory and research suggesting that a vital component of the experience of social class is determined by people’s subjective perceptions of their own rank relative to others (Kraus & Keltner, 2013; Kraus, Piff, & Keltner, 2011; Kraus, Tan, et al., 2013). Someone who feels that she has relatively less resources and status compared to others is likely to also feel that her life is more subject to external, environmental constraints, and that it will be more difficult for her to gather the necessary resources to navigate threats and take opportunities (Kraus, Piff, & Keltner, 2009; Kraus et al., 2012). She is therefore more likely to feel lower self-worth (because of her relatively low economic worth), and more likely to be vigilant to threats (because of her relatively low ability to control these threats) (Gallo & Matthews, 2003; Kraus, Horberg, Goetz, & Keltner, 2011; Kraus & Park, 2014). Our findings suggest that one way in which these tendencies may manifest themselves is in more conservative, pessimistic expectations of how she will be seen by others. It is possible that this is a self-protective mechanism to ensure that she does not take the risk of assuming others see her positively, because a mistake would be more costly to her than it would to a high SES person. However, our findings also highlight how these negative meta-perceptions – which are inaccurate – lead to more internal attributions for failure, which may in turn reduce her persistence and make it more difficult for her to take opportunities that could potentially
increase her status. In this way, low perceptions of one’s social rank may create a vicious, self-perpetuating cycle of low rank.

However, one could also argue that, because our findings largely emerge with subjective and not objective measures of SES, we are not capturing an SES-based difference at all, but rather some other variable that covaries with both meta-perceptions and subjective perceptions of one’s rank. Perhaps the most likely such variable is one’s positive self-regard, as people with more negative self-regard might be likely to both think they are seen negatively by others and think they occupy a low rank relative to others in society. We instead view self-regard as a mechanism that connects low self-perceived social rank to negative meta-perceptions, but as we do not have causal evidence of directionality, it is possible to argue that the causal chain should instead begin with self-regard, with social rank and meta-perceptions as outcomes. To address this issue, we are currently planning an experimental study where we manipulate subjective SES (e.g., Kraus, Côté, & Keltner, 2010). However, we also currently consider this alternative explanation to be unlikely for two reasons. First, in both studies where we measured self-regard (self-esteem and narcissism in Study 1B, and self-esteem alone in Study 4B), the relationships between subjective SES and meta-perceptions held controlling for self-regard (regardless of whether we controlled for self-esteem alone, narcissism alone, or a composite of self-esteem and narcissism). Second, in both studies where we measured self-perceived warmth and competence (Study 1B and Study 2), the relationships between subjective SES again held controlling for self-perceptions. It is therefore implausible that self-regard could entirely explain the effect of subjective SES on meta-perceptions.

The fact that the observed effects held controlling for self-perceptions points to another important implication of this research: Even when a low and high SES person both believe
themselves to be equally warm and competent, the high SES person is more confident that her warmth and competence will be recognized by others (perhaps because she is more confident that she will be able to control the impressions that others form of her). This has important consequences for motivation – if a potential date will not recognize her warmth, or an interviewer will not recognize her competence, why ask that person out or try to secure that job? Again, as with internal attributions for failure, this may result in high SES people trying harder and ultimately succeeding more, thereby exacerbating inequality (Laurin, Engstrom, & Alic, 2019).

Future research should investigate the consequences of these SES-linked meta-perceptions for persistence and motivation, to determine whether these speculative implications we have drawn hold any water. Future research might also explore under what circumstances these effects may be mitigated so that low SES people could feel more confident and optimistic about their social interactions. For example, low SES people prefer to affiliate with those are also low SES (Côté et al., 2017); perhaps this is because they have more positive expectations about how similar-SES others will see them. Finally, it may be the case that the warm-but-incompetent hypothesis is true when people are more aware of their SES being perceived by others, for example, in cross-class encounters, when meta-stereotypes are more likely to be salient (Frey & Tropp, 2006). Investigations into this possibility could nuance our findings by demonstrating when SES has a uniformly positive relationship to meta-perceptions, and when SES has a more ambivalent relationship to meta-perceptions.

Conclusion

As one of our low SES participants put it when we asked him to describe why he placed himself where he did on the SES ladder, “I don't make a lot of money, and I don't have much
social standing. I'm a nobody.” We demonstrate that these feelings of lacking social standing, of being a nobody, are intimately linked to how people expect others to see them. Despite stereotypes of low SES people being warm but incompetent, low SES people expect to be seen negatively across domains, as both cold and incompetent. These negative expectations may lead people to conclude they are at fault when they discover they have performed poorly, and perhaps, to forego opportunities to try again. In this way, feeling low status may ultimately reinforce low status.
References


Foster, J. D., Campbell, W. K., & Twenge, J. M. (2003). Individual differences in narcissism:
Inflated self-views across the lifespan and around the world. *Journal of Research in Personality, 37*(6), 469–486. https://doi.org/10.1016/S0092-6566(03)00026-6


Personality and Social Psychology, 75(3), 729–750.


Kennet, B. (2016). What people think of me: Your quick guide to caring less. Skinny Bottle


https://doi.org/10.1177/0956797610387613


https://doi.org/10.1037/a0032895


https://doi.org/10.1037/a0016357


https://doi.org/10.1017/S0140525X1600234X


https://doi.org/10.1177/1948550610378757


https://doi.org/10.1037/0022-3514.93.5.814


https://doi.org/10.1080/1047840X.2013.795099


Appendix: Supplemental Tables

Supplemental Table 1

Regression analyses with SES predicting meta-perceptions of each facet of warmth, sociability and morality, separately, Study 1A-1B and 3A-4B.

<table>
<thead>
<tr>
<th>Dependent variable (meta-perception type)</th>
<th>Predictor</th>
<th>Study 1A $\beta$</th>
<th>Study 1B $\beta$</th>
<th>Study 3A $\beta$</th>
<th>Study 3B $\beta$</th>
<th>Study 4A $\beta$</th>
<th>Study 4B $\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sociability</td>
<td>Subjective SES</td>
<td>.32 &lt;.001</td>
<td>.17 .004</td>
<td>.07 .453</td>
<td>.19 .011</td>
<td>.23 &lt;.001</td>
<td>.22 &lt;.001</td>
</tr>
<tr>
<td>Morality</td>
<td></td>
<td>.14 .064</td>
<td>.17 .004</td>
<td>.09 .337</td>
<td>.21 .005</td>
<td>.20 &lt;.001</td>
<td>.25 &lt;.001</td>
</tr>
<tr>
<td>Sociability</td>
<td>Childhood income</td>
<td>.19 .010</td>
<td>.09 .125</td>
<td>-.02 .798</td>
<td>-.13 .086</td>
<td>.03 .597</td>
<td>-.03 .659</td>
</tr>
<tr>
<td>Morality</td>
<td></td>
<td>-.04 .615</td>
<td>-.03 .577</td>
<td>.09 .322</td>
<td>-.14 .062</td>
<td>.01 .862</td>
<td>-.01 .919</td>
</tr>
<tr>
<td>Sociability</td>
<td>Annual income</td>
<td>.06 .303</td>
<td>.14 .120</td>
<td>.06 .442</td>
<td>.08 .173</td>
<td>.19 .002</td>
<td></td>
</tr>
<tr>
<td>Morality</td>
<td></td>
<td>.01 .806</td>
<td>.16 .081</td>
<td>.07 .344</td>
<td>.09 .130</td>
<td>.20 &lt;.001</td>
<td></td>
</tr>
<tr>
<td>Sociability</td>
<td>Household income</td>
<td>.03 .643</td>
<td>-.02 .839</td>
<td>.003 .972</td>
<td>.002 .964</td>
<td>.12 .043</td>
<td></td>
</tr>
<tr>
<td>Morality</td>
<td></td>
<td>.01 .825</td>
<td>-.03 .723</td>
<td>.001 .991</td>
<td>.02 .787</td>
<td>.12 .052</td>
<td></td>
</tr>
<tr>
<td>Sociability</td>
<td>Education</td>
<td>.08 .195</td>
<td>-.12 .189</td>
<td>.02 .754</td>
<td>.05 .375</td>
<td>.05 .368</td>
<td></td>
</tr>
<tr>
<td>Morality</td>
<td></td>
<td>.03 .669</td>
<td>-.08 .394</td>
<td>.02 .754</td>
<td>.03 .603</td>
<td>.11 .057</td>
<td></td>
</tr>
<tr>
<td>Sociability</td>
<td>Parents’ average</td>
<td>.06 .397</td>
<td>.09 .112</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morality</td>
<td>education</td>
<td>-.10 .160</td>
<td>.03 .611</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sociability</td>
<td>Parents’ average</td>
<td></td>
<td>.00 .912</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morality</td>
<td>years of education</td>
<td></td>
<td>.00 .967</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: All models were run separately (i.e., with only one SES predictor at a time), and all include gender as a covariate (effect coded so -1 = female, 1 = male). Education and parents’ average education both refer to highest educational degree achieved. In Study 1A, childhood income is current parental income (because participants were undergraduates). In Study 3A-4B, this table uses pre-interaction expected meta-perceptions as the dependent variable. Study 2 is not included because we did not measure each facet of warmth separately in that study. Not all predictors were included in all studies, so some rows are left blank.
**Supplemental Table 2**

*Exploratory mediation analyses, Study 1B, decomposing self-regard and self-presentation into their components and testing each component separately as a mediator (see Footnote 2).*

<table>
<thead>
<tr>
<th>Mediator</th>
<th>Meta-perception dimension</th>
<th>a</th>
<th>b</th>
<th>a*b</th>
<th>c'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-esteem</td>
<td>Competence</td>
<td>-.02</td>
<td>-.03</td>
<td>.610</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Warmth</td>
<td>.09</td>
<td>.11</td>
<td>.061</td>
<td></td>
</tr>
<tr>
<td>Narcissism</td>
<td>Competence</td>
<td>.04</td>
<td>.35</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Warmth</td>
<td>.88</td>
<td>.22</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td>“How hard would you try to convey a good impression?”</td>
<td>Competence</td>
<td>.11</td>
<td>.18</td>
<td>.003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Warmth</td>
<td>.23</td>
<td>.32</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td>“If you did try…how successful do you think you would be?”</td>
<td>Competence</td>
<td>.59</td>
<td>.65</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Warmth</td>
<td>.59</td>
<td>.67</td>
<td>&lt;.001</td>
<td></td>
</tr>
</tbody>
</table>

| Note: | The independent variable for all these analyses is subjective SES. All models were run separately (i.e., with one mediator per model), and include gender as a covariate. Path c is omitted because it is presented in Table 4 in the main text. |

**Supplemental Table 3**

*Regression analyses with SES predicting meta-perceptions, controlling for self-perceptions, Study 1B (see Footnote 2).*

<table>
<thead>
<tr>
<th>Dependent variable (meta-perception dimension)</th>
<th>b</th>
<th>SE b</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence</td>
<td>.07</td>
<td>.03</td>
<td>.15</td>
<td>2.77</td>
<td>.006</td>
</tr>
<tr>
<td>Warmth</td>
<td>.05</td>
<td>.02</td>
<td>.11</td>
<td>2.36</td>
<td>.019</td>
</tr>
</tbody>
</table>

| Note: | All models were run separately, and all include gender as a covariate (effect coded so -1 = female, 1 = male). Each also includes the appropriate self-perception dimension as a covariate (e.g., in the model predicting competence meta-perceptions, we control for competence self-perceptions). The independent variable for all models is subjective SES. The sample size for these analyses is 286 rather than 287 because one participant did not complete the self-perception items. |
Supplemental Table 4

Multilevel regression analyses predicting meta-perceptions, Study 2, with self-perceptions as a covariate (see Footnote 3).

<table>
<thead>
<tr>
<th>Model</th>
<th>Predictor</th>
<th>b</th>
<th>SE  b</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Including competence</td>
<td>Target self-perceptions</td>
<td>.37</td>
<td>.00</td>
<td>91.98</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>ratings</td>
<td>Target SES</td>
<td>.00</td>
<td>.01</td>
<td>.73</td>
<td>.464</td>
</tr>
<tr>
<td>Competence</td>
<td>.31</td>
<td></td>
<td>.00</td>
<td>66.97</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Target SES X competence</td>
<td>.01</td>
<td></td>
<td>.00</td>
<td>4.80</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Including warmth ratings</td>
<td>Target self-perceptions</td>
<td>.37</td>
<td>.00</td>
<td>94.74</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Target SES</td>
<td>.00</td>
<td></td>
<td>.01</td>
<td>.73</td>
<td>.466</td>
</tr>
<tr>
<td>Warmth</td>
<td>.44</td>
<td></td>
<td>.00</td>
<td>73.67</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Target SES X warmth</td>
<td>.02</td>
<td></td>
<td>.00</td>
<td>6.45</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Note: All predictors are grand-mean-centered. All models include random intercepts for targets and perceivers, and target self-perceptions as a covariate. The dependent variable for all models is meta-perceptions.

Supplemental Table 5

Multilevel regression analyses predicting perceptions, Study 2.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Model with competence rating of traits</th>
<th>b</th>
<th>SE  b</th>
<th>t</th>
<th>p</th>
<th>Model with warmth rating of traits</th>
<th>b</th>
<th>SE  b</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual income</td>
<td>.004</td>
<td>.01</td>
<td>.06</td>
<td>.66</td>
<td>.513</td>
<td>.004</td>
<td>.01</td>
<td>.59</td>
<td>.558</td>
<td>.558</td>
</tr>
<tr>
<td>Trait rating</td>
<td>.63</td>
<td>.01</td>
<td>124.32</td>
<td>&lt;.001</td>
<td></td>
<td>.66</td>
<td>.01</td>
<td>94.05</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td>Annual income X trait rating</td>
<td>.002</td>
<td>.01</td>
<td>.39</td>
<td>.695</td>
<td></td>
<td>.004</td>
<td>.01</td>
<td>.59</td>
<td>.555</td>
<td></td>
</tr>
<tr>
<td>Household income</td>
<td>-.003</td>
<td>.003</td>
<td>-.89</td>
<td>.373</td>
<td></td>
<td>-.003</td>
<td>.003</td>
<td>-.84</td>
<td>.399</td>
<td></td>
</tr>
<tr>
<td>Trait rating</td>
<td>.63</td>
<td>.01</td>
<td>119.63</td>
<td>&lt;.001</td>
<td></td>
<td>.66</td>
<td>.01</td>
<td>90.35</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td>Household income X trait rating</td>
<td>-.001</td>
<td>.002</td>
<td>-.63</td>
<td>.531</td>
<td></td>
<td>-.001</td>
<td>.003</td>
<td>-.24</td>
<td>.813</td>
<td></td>
</tr>
<tr>
<td>Income growing up</td>
<td>.003</td>
<td>.004</td>
<td>.68</td>
<td>.497</td>
<td></td>
<td>.02</td>
<td>.004</td>
<td>.57</td>
<td>.572</td>
<td></td>
</tr>
<tr>
<td>Trait rating</td>
<td>.63</td>
<td>.01</td>
<td>120.85</td>
<td>&lt;.001</td>
<td></td>
<td>.66</td>
<td>.01</td>
<td>91.65</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td>Income growing up X trait rating</td>
<td>.003</td>
<td>.003</td>
<td>1.08</td>
<td>.278</td>
<td></td>
<td>.01</td>
<td>.004</td>
<td>1.75</td>
<td>.081</td>
<td></td>
</tr>
</tbody>
</table>

Note: All predictors are grand-mean-centered. All models were run separately and include gender as a covariate (effect coded so -1 = female, 1 = male) and random intercepts for targets and perceivers. The dependent variable for all models is perceptions.
Supplemental Table 6

Subjective SES predicting meta-perceptions after chat conversations, Study 3A-4B.

<table>
<thead>
<tr>
<th>Dependent variable (meta-perception dimension)</th>
<th>Study 3A</th>
<th></th>
<th>Study 3B</th>
<th></th>
<th>Study 4A</th>
<th></th>
<th>Study 4B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence</td>
<td>0.16</td>
<td>0.064</td>
<td>0.20</td>
<td>0.002</td>
<td>0.24</td>
<td>&lt;.001</td>
<td>0.35</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Warmth</td>
<td>0.13</td>
<td>0.119</td>
<td>0.19</td>
<td>0.003</td>
<td>0.16</td>
<td>0.016</td>
<td>0.30</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Note: These models all include gender as a covariate (effect coded so -1 = female, 1 = male). The independent variable in all models is subjective SES. These datasets include all participants except those who failed the attention check and those whose chats did not work properly.