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With whom, and about what, do we compete for social status? Effects of social closeness and relevance of reference groups for positional concerns

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A B S T R A C T

We used an experimental approach to test if there is a link between positional preferences and the social *closeness* and *relevance* of the reference group. More specifically, we tested if people are more positional when they compare with friends and colleagues than when they compare to an anonymous person in society. We further tested if the gender of the members in the reference group is important, and if positional preferences can be linked to an individual's social identity. Our results lend support to the hypothesis that social identification with a domain is correlated with positional concerns in that domain. However, in contrast to our hypotheses, we find that comparisons with an anonymous person in society trigger positional concerns among a significantly larger share of participants than do comparisons with friends or colleagues. Finally, although we find that both the gender of the participant and of the reference group has an effect on positional concerns in some domains, our analysis also indicates that not all domains are gendered. We discuss potential explanations behind these findings.

1. Introduction

Karoshi – the Japanese term for death from overwork, and *karojisatsu* – suicide due to mental stress, arise from intense comparisons of work performance between colleagues (McAdams, 1992). How can work be worth dying for? A possible answer to this question is that relative work performance is a strong signal of social status among people who see their profession as a central part of their identity, i.e., that employees who commit karojisatsu are positional about work. In this paper, we analyze the link between social identification and positional preferences, and test if the social closeness and relevance of the reference group matter for positional concerns in different social domains.

It is today widely acknowledged that most people engage in social comparisons and that our wellbeing, at least in part, depends on our social position (e.g. Duesenberry, 1949, Easterlin, 1995, Frank, 1985, Veblen, 1899).

Economists operationalize concerns for social position (positional preferences) as preferences for relative consumption (e.g. Alpizar, Carlsson and Johansson-Stenman, 2005; Aronsson and Johansson--Stenman, 2014; Aronsson and Johansson-Stenman, 2008; Aronsson and Johansson-Stenman, 2010; Carlsson, Johansson-Stenman and Martinsson, 2007; Clark and Senik, 2010; Clark, Senik and Yamada, 2017; Solnick and Hemenway, 2005; Solnick and Hemenway, 1998). Positional preferences incentivize agents to over-invest in positional activities to keep up with the Joneses, and therefore cause market failures[1] (e.g. Aronsson and Johansson-Stenman, 2014; Aronsson and Johansson--Stenman, 2008; Aronsson and Johansson-Stenman, 2010). The empirical estimates in Alpizar, Carlsson, and Johansson-Stenman (Alpizar, Carlsson and Johansson-Stenman, 2005) suggest that the consumption externalities associated with positional preferences can be large.[2] This motivates policy interventions.

Theoretical research on positional preferences suggests that first- or second-best solutions can be achieved by use of policy instruments in the form of taxes or fees (e.g. Aronsson and Johansson-Stenman, 2014; Aronsson and Johansson-Stenman, 2008; Aronsson and Johansson--Stenman, 2010; Aronsson and Mannberg, 2015). The optimality of these policy instruments hinges crucially on the assumptions made about what, and with whom, people compete for social status. Taxes and fees may be optimal if positional goods are limited to a distinct set of status commodities. However, if different social groups are positional about

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[1] Social comparisons naturally also have positive side effects. For example, under incomplete information, relative performance information can provide both principals and agents with information about the absolute quality of the agents' performance. Social comparisons may therefore enhance overall performance within firms by providing strong incentives to outperform (e.g. Bull, Schotter and Weigelt, 1987; Hannan, Krishnan and Newman, 2008; Lazear and Rosen, 1981).

[2] Results from tournament experiments further suggest that preferences for social rank can drive agents to avoid competitive settings (Balafoutas, Kerschbamer and Sutter, 2012) induce advantaged agents to shirk and incentivize disadvantaged agents to cheat or give up (e.g. Bull, Schotter and Weigelt, 1987; Hannan, Krishnan and Newman, 2008).

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different things, and some groups hold positional concerns for leisure activities and personality characteristics, it can be difficult, perhaps even impossible, to design a tax instrument that achieves first best (Mannberg and Sjögren, 2021). With whom people compete for social status is important, because the reference group affects towards whom the policy should be targeted and determines if some groups should be exempted from the intervention.

Two important questions are therefore whether the empirical findings support the notion that people mainly have positional preferences for only a limited set of commodities, and whether we know who the Joneses are. The answers to these questions are not unambiguous. There is relatively ample evidence that visual commodities connected to income or wealth, e.g., cars and houses, trigger positional concerns (Alpizar, Carlsson and Johansson-Stenman, 2005, Carlsson, Johansson-Stenman and Martinsson, 2007, Solnick and Hemenway, 1998). However, it also appears that other, less wealth-related domains, such as personality characteristics and physical appearance (Hillesheim and Mechtel, 2011, Solnick and Hemenway, 1998), vacations and insurance (e.g. Alpizar, Carlsson and Johansson-Stenman, 2005), and risky leisure activities (Mannberg, Hendrikx and Johnson, 2021) are relatively positional. In other words, the variety of goods that trigger positional concerns is relatively wide. A few studies further suggest that the intensity of positional concerns for income and leisure time vary between different cultures (Carlsson, Nam, Linde-Rahr and Martinsson, 2007), income levels (Akay, Martinsson and Medhin, 2012), and age groups (Akay and Martinsson, 2019). These results indicate that status signaling behavior varies between different social groups. However, we lack knowledge on potential group differences in positional concerns in other domains than income or leisure time. We further do not know anything about the mechanisms behind *why* different groups are positional about different things.

The literature regarding with whom people compete for social status, i.e., who the Joneses are, is relatively scarce. Senik (Senik, 2009) uses data from 28 post-transition countries (plus Turkey) and finds that doing better in life than colleagues and high school mates has a larger impact on satisfaction with life than income comparisons with the general population. Senik (Senik, 2009) further finds that comparisons with friends and colleagues influence individual welfare more than comparisons with parents. A few studies have asked participants directly about with whom they compare their income (Carlsson, Gupta and Johansson-Stenman, 2008, Carlsson and Qin, 2010, Clark and Senik, 2010, Frank, 2005, Knight, Lina and Gunatilaka, 2009, Luttmer, 2005). These studies in general confirm the finding of Senik (Senik, 2009), i.e., that people mainly compare their income with individuals who are socially or geographically close to them. However, not all close reference groups appear to be equally important for income comparisons. Knight, Lina, and Gunatilaka (Knight, Lina and Gunatilaka, 2009) and Carlsson and Qin (Carlsson and Qin, 2010) find that people in rural China mainly compare with their neighbors and other people in the same village, and that relatively few compare with relatives or with people outside the village. Clark and Senik (Clark and Senik, 2010) use data from the European Social Survey and find that substantially more respondents compare their income with colleagues than with family, friends, or "other." Neither of these studies experimentally tests if the reference group affects the degree of positionality. We only know of one study that does so.

Akay, Martinsson, and Medhin (Akay, Martinsson and Medhin, 2012) test if income comparisons with six different reference groups (friends, colleagues, neighbors, relatives, people of the same age, and others in the same city) affect positional choices for income among 260 inhabitants in Addis Ababa. Their bivariate analysis suggests that comparisons with neighbors trigger more positional concerns than comparisons with relatives or other people in Addis Ababa. However, probably due to a very low degree of positionality in their sample, these findings do not survive multivariate tests. Taken together, previous research suggests that the reference group *may* be important for positional preferences for income, but we still have no knowledge on how the reference group affects positional concerns in other domains.

The aim of the current study was to add knowledge both on the role of the reference group for positional concerns, and on the question of why people appear to compare more in some domains than other. More specifically, we asked two research questions: Do people display more positional concerns when they compare with a *socially close* and *relevant* reference group than with a distant and abstract group? And, is there a link between our identification with certain social groups (i.e., our social identities) and the type of activities and characteristics that we are positional about?

These research questions are based on previous work in evolutionary and social psychology. Social groups can distribute resources and work tasks among their members and across time. An individual's chances to survive and reproduce are therefore greatly enhanced if she belongs to a group (Baumeister and Leary, 1995, Dunbar, 2003, Dunbar and Shultz, 2007, Kurland and Beckerman, 1985, Suls, Martin and Wheeler, 2002), and if she holds a relatively high social rank within the group (Anderson, John, Keltner and Kring, 2001, Barkow et al., 1975, Barkow, Cosmides and Tooby, 1992, Baumeister and Leary, 1995). The evolutionary role of social status has created a link between our relative social performance and our self-esteem (Baumeister, Tice and Hutton, 1989). Research suggests that we use individuals close to us as a proxy for information on our social performance (Lubbers, Kuyper and Van Der Werf, 2009, Suls, Martin and Wheeler, 2002). We therefore compare relatively more with specific and close reference groups (e.g., friends) than with general and distant others (e.g. Lubbers, Kuyper and Van Der Werf, 2009; Black, 2000], and we mainly feel threatened when someone who is socially close and similar to us outperforms us (Tesser, 1988). The types of characteristics and behaviors providing agents with social status in a social group depend on the social norms present in this group. Since different social groups have different social norms, the behaviors that signal a high social status can vary between different social settings.

Most individuals belong to many different social groups. Our memberships in these groups define our *social identities*, e.g., being a *woman*, an *economics professor*, and a *long-distance runner* (e.g. Akerlof and Kranton, 2000; Leach et al., 2008; Stets and Burke, 2000; Tajfel, 2010; Ismail, 2018; JATOS, 2021). The relative importance of each of these social identities varies from individual to individual, and our self-esteem is especially sensitive to feedback on behaviors that are linked to a social identity central to our self-image (Leach et al., 2008).

Based on the above, we hypothesized that positional preferences stem from the evolutionary advantage that a high social rank provides. We predicted that people would have more positional concerns when they compared with a reference group that was socially close, and relevant for the behavior in question, and when the activity was associated with a valued social identity in that specific domain. We further hypothesized that gender constitutes an important social identity for both men and women, and therefore that men and women compete more with members of the same sex than with members of the opposite sex, especially in gender stereotypical domains. We tested our hypotheses using a survey experimental approach. We elicited positional preferences in five different domains with randomly assigned reference groups. We further randomized information on the gender of members in each of the reference groups.

Our study contributes to the literature in at least three ways. First, we add knowledge on with whom people compete for social status. In contrast to Knight, Lina, and Gunatilaka (Knight, Lina and Gunatilaka, 2009), Carlsson and Qin (Carlsson and Qin, 2010), and Clark and Senik (Clark and Senik, 2010), who ask with whom people compare their income, we experimentally test if the reference group affects positional concerns. Our study complements the work of Akay, Martinsson, and Medhin (Akay, Martinsson and Medhin, 2012) by assessing if the effect of the reference group varies over different domains, i.e., if the relevance of the reference group matters, and by using a larger and more heterogeneous sample. Second, we experimentally test for gender effects on

positional preferences. Many studies on positional concerns include gender as a control variable. However, to the best of our knowledge, no previous study explores if positional concerns can be linked to gender stereotypes. Finally, our study represents a first attempt to evaluate the link between positional concerns and social identification. As such, it contributes to an increased understanding of how and why positional preferences differ between different social groups.

The rest of the article is structured as followed: In section (2), we present our hypotheses, participants, measurement instruments, and experimental design. Section (3) presents the results, and in section (4) we provide a general discussion of our findings. We discuss limitations and implications for future research in section (5).

2. Materials and Method

2.1. Hypotheses

We evaluated the role of social closeness and relevance of the reference group with five hypotheses, and the link between positional preferences and social identity with one hypothesis. All hypotheses were pre-registered on the OSF platform (https://osf.io/mbs9h).[3]

2.1.1. The role of the reference group

H1. People display more positional concerns when the reference group is socially close, than when it is distant.
H2. People display more positional concerns when the reference group is socially relevant for the activity at hand.

2.1.2. Gender

H3. Men display more positional concerns in stereotypically male domains.
H4. Women display more positional concerns in stereotypically female domains.
H5. People display more positional concerns when they compare with others of the same sex, especially in gender stereotypical domains.

2.1.3. Social identity

H6. People display more positional concerns when the activity is linked to a social identity that is central to the individual's self-concept.

2.2. Measurement instruments

2.2.1. Positional preferences and identification

Positional individuals care about how their level of consumption compares to that of others. The utility of a positional agent therefore contains both the absolute and relative consumption value of the positional good. One simple example of a utility function for a positional individual is: $u_i(x_i,\ \Delta_i(x_i,\overline{x}))$, where x_i is the consumption value of the positional good, and $\overline{x}$ is the average level of consumption value in some reference group. The expression $\Delta_i(x_i,\overline{x})$ represents relative consumption. The marginal degree of positionality measures the fraction of the overall utility increase from a marginal increase in consumption that is due to increased relative consumption. Labelling the degree of positionality as γ, we can define it as follows:

$$\gamma = \frac{\frac{\partial u_i}{\partial \Delta_i}\cdot\frac{\partial \Delta_i}{\partial x_i}}{\frac{\partial u_i}{\partial x_i} + \frac{\partial u_i}{\partial \Delta_i}\cdot\frac{\partial \Delta_i}{\partial x_i}} \tag{1}$$

Most previous studies use either a ratio comparison utility function ($\Delta_i(x_i,\overline{x}) = x_i/\overline{x}$) or an additive comparison utility function ($\Delta_i(x_i,\overline{x}) = x_i - \overline{x}$). In this study, we followed (Carlsson, Johansson-Stenman and Martinsson, 2007) and used the simple additively linear utility function $u_i(x_i,\ \Delta_i(x_i,\overline{x})) = (1-\gamma)\cdot x_i + \gamma\cdot(x_i - \overline{x})$. Similarly to most other studies on positional preferences, we operationalized γ by use of a set of hypothetical choice scenarios (e.g. Alpizar, Carlsson and Johansson-Stenman, 2005; Carlsson, Johansson-Stenman and Martinsson, 2007; Celse, 2012; Hillesheim and Mechtel, 2011; Solnick and Hemenway, 2005; Solnick and Hemenway, 1998). More specifically, for each domain, we asked our respondents to imagine a situation where they could choose which state of the world to live in. The participants were instructed to choose the alternative that would make them most happy, and not to evaluate the options with regard to what is best for society as a whole. Participants could choose between four alternatives (A - D). An example question for income is provided below.

In the following questions, there are four states of the world.

You are asked to pick which of the four **you** would prefer to live in. You *should not* consider which society that is best on the whole. The questions are independent from each other. If you do not have a preference, choose 'I have no preference.'

Please note that, except for the factor described in each question, all states of the world are **completely identical**. The price level is equal to the current price level.

There are no 'right' or 'wrong' answers.

In which of these states of the world do you think that you would feel most satisfied?

A Your monthly wage before taxes is USD 6 300. In society, people on average earn USD 7 900.
B Your monthly wage before taxes is USD 5 100. In society, people on average earn USD 4 300.
C Your monthly wage before taxes is USD 5 100. In society, people on average earn USD 5 100.
D Your monthly wage before taxes is USD 5 100. In society, people on average earn USD 7 900.

Alternative A (absolute) always represented a state of the world in which the individual had most in absolute terms, but relatively less than an average person in the reference group. In alternative B, the individual always had a lower level of consumption than in alternative A, but relatively more than an average person in the reference group. This was thus the positional alternative. Celse (Celse, 2012) found that a relatively large share of respondents displayed inequality aversion. To avoid that participants with inequality aversion chose the positional alternative, we included an alternative where the individual had the same level of consumption as in alternative B, and the same level of consumption as the average person in the reference group. We controlled for violations of the non-satiation assumption (more is better) by a fourth alternative (D), in which the respondent was worse off both in absolute and relative terms. Finally, we allowed participants to answer that they are indifferent between alternatives, or that they were unable to answer.

In theory, the marginal degree of positionality can be identified by varying the values in alternatives A and B, and finding the relative values that make an individual indifferent between the two alternatives (Alpizar, Carlsson and Johansson-Stenman, 2005, Carlsson, Gupta and Johansson-Stenman, 2008, Carlsson, Johansson-Stenman and Martinsson, 2007). Using the additively linear utility function outlined above, the value of gamma for someone who is indifferent between A and B is given by equation (2).

$$\gamma = \frac{x_A - x_B}{\overline{x}_A - \overline{x}_B} \tag{2}$$

[3] The pre-registered hypotheses had a slightly different phrasing. We have changed the wording to improve readability and interpretation. The predictions remain unaltered.

Table 1
Absolute and relative consumption values across alternatives and domains.

Domain	Option	(1) Self (x_i)	(2) Others ($\bar{x}$)	(3) γ	(4) $x_{iA}/\bar{x}_A$	(5) x_{iB}/x_{iA}
Income				0.33	0.80	0.81
	A	6300	7900			
	B	5100	4300			
	C	5100	5100			
	D	5100	7900			
Work performance				0.33	0.80	0.81
	A	52	65			
	B	42	35			
	C	42	42			
	D	42	65			
Physical strength				0.33	0.80	0.81
	A	52	65			
	B	42	35			
	C	42	42			
	D	42	65			
Beauty				0.33	0.80	0.81
	A	52	65			
	B	42	35			
	C	42	42			
	D	42	65			
Social media				0.33	0.80	0.81
	A	800	1000			
	B	650	550			
	C	650	650			
	D	650	1000			

In this expression, x_A is the individual's consumption level in state A (absolute), and x_B is the consumption level in state B (positional). $\bar{x}_A$ and $\bar{x}_B$ represent the average level of consumption in the reference groups in state A and B, respectively.

In practice, however, it is not possible to estimate γ precisely. Instead, many studies use a lower bound for γ to determine the share of respondents who have a marginal degree of positionality corresponding to at least this level (Celse, 2012, Hillesheim and Mechtel, 2011, Solnick and Hemenway, 2005, Solnick and Hemenway, 1998). A few studies have also estimated the distribution of positional preferences in intervals of γ (Alpizar, Carlsson and Johansson-Stenman, 2005, Carlsson, Johansson-Stenman and Martinsson, 2007). Since the main purpose of our paper was to test if the type of reference group affects the share of proportional answers in different domains, and since long surveys may result in mindless responses, we used a lower bound instead of several interval estimates. In other words, participants only read one hypothetical scenario for each domain, and we defined an individual as positional if she or he chose alternative B, and non-positional if any of the other alternatives were chosen.

There is no gold standard for which lower bound of γ to use. While some researchers have used values as low as 0.15 (Celse, 2012), others have used values as high as 0.4 (Hillesheim and Mechtel, 2013). In this study, we used a lower bound of γ equal to 0.33. This value can be derived from the above example by the simple calculation in equation (3).

$$\gamma = \frac{6\ 300 - 5\ 100}{7\ 900 - 4\ 300} = 0.33 \tag{3}$$

This means that individuals who are identified as positional in our sample had relatively strong preferences for social position: at least 33 percent of the overall utility increase from a marginal increase in consumption is due to increased relative consumption.

2.2.2. Domains and values

We elicited positional preferences in five different domains – income, work performance, physical strength, beauty, and social media followers. These domains represent characteristics that can be expected to signal status in some social groups. Income and work performance are signals of an individual's ability to amass material resources. Physical strength and beauty are signals of physical health and related to reproduction abilities. Previous research suggests that wealth and protective capacity constitute valuable characteristics for men, while beauty and friendliness are valued characteristics for women (Baumeister, Reynolds, Winegard and Vohs, 2017, Bem, 1981, Buss, 1989, Eagly and Wood, 2016, Geary, Vigil and Byrd-Craven, 2004, Kenrick and Keefe, 1992, Udry and Eckland, 1984, Wiederman, 1993). We therefore expected physical strength and beauty to be closely linked to men and women's gender identities. Finally, social media followers is a proxy for social popularity (Bonds-Raacke and Raacke, 2010, Nadkarni and Hofmann, 2012), which in turn is an indication of an individual's social abilities.

There is no standard practice for how to choose the consumption values in the individual questions. Some researchers have used relatively high values that are likely unattainable by a large share of the population (Solnick and Hemenway, 2005, Solnick and Hemenway, 1998), while others have used values that can be lower than the respondent's actual level of consumption (e.g. Hillesheim and Mechtel, 2013). We have not come across any paper that motivates their choice of values. In our study, we tried to use values that represent desirable, but not unattainable values to the respondents.

We used monthly income before taxes to measure positional preferences for *income*, and defined the base level as 10 percent above the median monthly income for men aged mid 40s in the United States in 2019 (see *Table 1*). We added the 10 percent to avoid loss aversion effects. As noted above, we used the number of social media followers as a proxy for social popularity. Social media platforms, such as e.g. Instagram, do not share data on user statistics, and we therefore lacked data on the average number of followers. However, social media communities have defined the minimum number of followers required to be considered as an influencer. A micro-influencer is defined as a person who has at least 1,000 followers.[4] We used this as the base level in the choice scenario for social media followers.

Assessing positional preferences for *work performance, physical strength, beauty*, and *social popularity* is difficult for many reasons. These are all relatively abstract concepts, and all are inherently relative. In addition, the meaning of the different concepts can vary between professions, and between individuals. Previous research studying similar characteristics (Celse, 2012, Solnick and Hemenway, 1998) and Hillesheim and Mechtel (Hillesheim and Mechtel, 2013) have employed nominal scales and counts to measure the absolute value of the characteristic. We used a similar approach. More specifically, we use a nominal scale running from 1 to 100 for work performance, physical strength, and beauty, with identical base levels across domains.

We present the values used in our choice experiments in *Table 1*. The two last columns show how the individual's level of consumption compared across alternatives A and B, and with the average level of consumption. In each domain, we calibrated the values such that the agent's consumption level in alternative A represented 80 percent of the average consumption value of referent others (see *Table 1*, *column 4*). Further, the individual's consumption level in alternative B (positional) always corresponded to 80 percent of his or her level in alternative A (absolute) (see *Table 1*, *column 5*).

2.2.3. Reference groups and gender

We use three reference groups – society, colleagues, and friends. These groups represent different levels of social closeness and domain relevance. Society is a socially distant reference group, while colleagues and friends are socially close reference groups. Our colleagues resemble us in education and professional preferences, and we likely have more information about their work performance and income than we have about other people in society, including our friends. Our colleagues'

[4] https://www.cmswire.com/digital-marketing/social-media-influencers-mega-macro-micro-or-nano/ on November 1st 2021

Table 2
Experimental treatments.

		Social closeness		
		Distant	Close	
		Society	Colleagues	Friends
Gender	Male	T1	T2	T3
	Female	T4	T5	T6
	No information	T7	T8	T9

Table 3
Distribution of responses across domains.

Domain	Absolute	Positional	Egalitarian	Indifference	Inferior
Income	0.274	0.245	0.388	0.068	0.025
Work performance	0.233	0.325	0.348	0.078	0.015
Physical strength	0.232	0.279	0.287	0.158	0.045
Beauty	0.247	0.263	0.305	0.151	0.034
Social media followers	0.130	0.159	0.159	0.474	0.078

Table 4
Differences in positionality between domains. Coefficients from a random effects logistic regression. Standard errors in parentheses.

	Positional preferences
Domain (ref is income)	
Work performance	0.486***
	(0.078)
Physical strength	0.213**
	(0.079)
Beauty	0.115
	(0.080)
Social media	-0.643***
	(0.087)
Socio-demographics	
Female	-0.263***
	(0.074)
Age/100	-6.708***
	(1.882)
Age/100 squared	6.404**
	(2.426)
Income (log)	0.147***
	(0.040)
Constant	-0.995**
	(0.381)
Number of observations	10090
Chi square	232.836

*** p<0.001, **p<0.01, *p<0.05.

performance and income thus provide us with a relatively good signal about our own work-related abilities. We therefore used colleagues as the domain relevant reference group for work performance and income. We socialize with our friends during leisure time, i.e., at the gym, at parties, and when we search for a partner. We therefore used friends as the domain relevant reference group for social media followers, physical strength, and beauty. Finally, to evaluate how the gender composition in the reference group affects positional concerns, we defined each reference group either as male, female, or gender neutral, e.g., "male friends," "female friends," or just "friends."

2.2.4. Social identity

We used four social identities – income, work performance, gender, and social popularity. To evaluate the relative importance of these identities, we relied on the hierarchical model developed by Leach et al. (Leach et al., 2008). The model has five different components sorted into two dimensions – self-definition and self-investment. These two components in the first dimension are *self-stereotyping* and *in-group homogeneity*, and the three components in the second dimension are *solidarity, satisfaction*, and *centrality*. Since, we were interested in how important the group was for an individual's self-concept, i.e., how central the social identity was for an individual's personal identity, we only used the *centrality* component. This component is measured via four statements for each domain (scale 1 = strongly disagree, to 6 = strongly agree) related to self-belonging (*I often think about the fact that I am a […]*), self-identity (*the fact that I am a […] is an important part of my identity*), and self-image (*Being a […] is an important part of how I see myself*). To ensure that we captured the link between the social identity and self-esteem, we also used a fourth question: *How important is […] for how you feel about yourself (your self-esteem)* (scale 1 = not at all important, to 6 = very important). The full set of social identity questions is available in section A.1.2 in the appendix.

2.3. Experimental design and sample

Our survey experiment had 9 treatments, divided into two groups – social closeness and gender. The different treatments are depicted in *Table 2*, below.

We randomized all treatments across and within participants. In other words, the reference group could be defined as "society" (T7) in the choice scenario on income, and as "female friends" (T6) in the choice scenario on work performance, for the same participant. Each participant answered only one positionality question for each domain, i.e., five choice scenarios in total.

Participants first answered the five questions pertaining to positional preferences, and thereafter the set of questions measuring social identification. The sequences of all questions within each set (positionality and social identity, respectively) were randomized to avoid ordering effects. The last section of the survey contained socio-demographic questions. We designed the survey using the online platform lab.js. The survey experiment contained a total of 13 questions and took about 8 minutes to complete.

We recruited participants (N = 2750) via Prolific Academics (prolific.co). The participants were paid an hourly wage of GBP 7.5 to answer the survey. To ensure anonymity, we used the online tool JATOS[5] to distribute the survey. Of the 2750 individuals who opened the survey, 2334 (85 percent) agreed to participate and provided valid information on country of residence. The vast majority of these participants resided in Europe (84 percent). Nearly 10 percent of the participants resided in North America, and about 5 percent in South America. Less than 2 percent resided in other world regions. About 50 percent of the participants held a university degree at the time of the survey.

Two-thousand and eighteen (73 percent) participants provided answers on all relevant questions in the survey, and defined themselves as either male or female. Of these, 1164 identified as male (57.7 percent) and 854 identified as female (42.3 percent). Mean age in the sample was 31 years (std = 10.61, min = 18, max = 76). Thirty-six percent of the sample defined themselves as students. The median participant had a monthly gross income in the interval 1001 – 2000 USD. The median income in the non-student sample (N = 1301) was in the interval 2001-3000 US. These numbers are substantially below the median income for men in their 40s in the United States. Our sample should therefore not be regarded as representative for the American population.

[5] JATOS (Just Another Tool for Online Studies) is an open source software, which allows researchers to recruit participants via e.g., Prolific Academics or Amazon Turk, without revealing individual answers to these sites (https://www.jatos.org/).

Table 5
Effects of social closeness of the reference group on positional choices. Two-sided proportion tests.

	Share of positional choices			Differences		
	Distant	Close				
Domain	Society (S)	Friends (F)	Colleagues (C)	S-F	S-C	F-C
Income	0.376	0.161	0.199	0.215***	0.177***	-0.038
Total N	N=668	N=666	N=684			
Work performance	0.385	0.292	0.302	0.093***	0.083**	-0.001
Total N	N=641	N=675	N=702			
Beauty	0.328	0.196	0.264	0.132***	0.064**	-0.068**
Total N	N=650	N=663	N=698			
Physical strength	0.345	0.243	0.251	0.102***	0.094***	-0.008
Total N	N=646	N=723	N=649			
Social media followers	0.182	0.140	0.154	0.042**	0.028	-0.014
Total N	N=708	N=635	N=669			

Table 6
Differences in proportions of positional answers across gender groups and domains. Proportion tests.

		Proportions of positional choices		Difference
		Males (M)	Females (F)	M-F
Male domains				
	Physical strength	0.360	0.169	0.191**
	Income	0.268	0.213	0.055***
	Work performance	0.321	0.330	-0.009
Female domains				
	Beauty	0.268	0.255	0.013
	Social media followers	0.162	0.155	0.007

*** p<0.001, **p<0.01, *p<0.05.

Table 7
Effects of gender stereotypes on positional concerns. Coefficients from random effects logistic regressions. Standard errors in parentheses.

	Positional preferences		
	Males	Females	All
Male stereotypical domain	0.637***	0.222**	0.224**
	(0.069)	(0.082)	(0.083)
Male			-0.002
			(0.100)
Male stereotypical domain# Male			0.407***
			(0.107)
Age/100	-6.377*	-7.547**	-6.609***
	(2.487)	(2.829)	(1.855)
Age/100 squared	6.536*	6.937	6.312**
	(3.289)	(3.545)	(2.390)
Income (log)	0.105*	0.203**	0.144***
	(0.051)	(0.061)	(0.039)
Constant	-1.142*	-1.505*	-1.325***
	(0.488)	(0.583)	(0.377)
Number of observations	5820	4270	10090
Chi Square	97.544	31.307	146.806

*** p<0.001, **p<0.01, *p<0.05.

3. Results

In this section we first provide an overview of the distribution of responses over all domains. In *section 3.2*, we present the results for the social closeness experiment (**H1**), and the relevance of the reference group for different social domains (**H2**), followed by tests of hypotheses related to gender (**H3-H5**). We end the result section with a presentation of our analysis of the relationship between social identity and positional concerns (**H6**).

3.1. Positional preferences and social domains

Table 3 displays the responses for each domain, regardless of reference group treatment. About one quarter to one third of participants chose alternative A (Absolute: 23 – 27 percent) and B (Positional: 24 – 32 percent) in the choice experiments on income, work performance, physical strength, and beauty. In accordance with the findings of Celse (Celse, 2012), a relatively large share (28 – 39 percent) of our participants stated that they preferred an equal distribution. Between 7 and 16 percent said that they were indifferent between alternatives, and a small share (2 – 5 percent) chose the inferior alternative. The distribution of answers to the choice experiment on social media followers was distinctly different from the other domains. Only about 16 percent chose the positional answer, nearly 50 percent said that they were indifferent, and 8 percent preferred strictly fewer social media followers to more.

To evaluate if our participants were more positional in some domains than in others, we utilized the panel structure of our dataset and estimated a logistic regression with random effects. The outcome variable in this regression took the value one if the individual chose the positional alternative (B) and zero otherwise. We included controls for gender, age[6], and income level. *Table 4* presents the results. As can be seen in the table, our results suggest that participants in our sample were more positional about work performance and physical strength, and less positional about social media followers than they were for income. We found no statistical difference between the probability that a participant was positional for income and beauty. We further found that women were less positional than men. Finally, our model suggests a U-shaped relationship between age and positional concerns. Our analysis of marginal effects suggests that the degree of positionality is lowest when people are in their fifties.

[6] We divided age by 100 to make the potentially non-linear relationship clearer.

Table 8
Male sample – Gender information treatment. Share of positional answers across domains. Two-sample proportion tests.

	Gender of referent others			Differences		
Domain	Same gender (S)	Opposite gender (O)	No info (N)	(S)-(O)	(S)-(N)	(O)-(N)
Income	0.318	0.155	0.301	0.163***	0.017	-0.146***
Total N	N=277	N=296	N=591			
Work performance	0.340	0.236	0.358	0.104**	-0.018	-0.122***
Total N	N=279	N=284	N=601			
Physical strength	0.398	0.435	0.304	-0.037	0.094**	0.131***
Total N	N=279	N=290	N=595			
Beauty	0.348	0.169	0.266	0.179***	0.082**	-0.097**
Total N	N=319	N=267	N=576			
Social media followers	0.225	0.120	0.150	0.105***	0.075**	-0.030
Total N	N=315	N=299	N=546			

*** p<0.001, **p<0.01, *p<0.05.

Table 9
Female sample – Gender information treatment. Share of positional answers across domains. Two-sample proportion tests.

	Gender of referent others			Differences		
Domain	Same gender (S)	Opposite gender (O)	No info (N)	(S)-(O)	(S)-(N)	(O)-(N)
Income	0.139	0.155	0.276	-0.016	-0.137***	-0.121***
Total N	N=209	N=206	N=439			
Work performance	0.233	0.251	0.418	-0.018	-0.185***	-0.167***
Total N	N=215	N=211	N=428			
Physical strength	0.226	0.130	0.157	0.096***	0.069**	-0.027
Total N	N=226	N=207	N=421			
Beauty	0.312	0.234	0.238	0.078*	0.074*	-0.004
Total N	N=218	N=208	N=425			
Social media followers	0.151	0.151	0.159	0.000	-0.008	-0.008
Total N	N=218	N=219	N=415			

*** p<0.001, **p<0.01, *p<0.05.

3.2. Effects of social closeness and relevance

To evaluate if the social closeness of the reference group affected positional concerns, we tested if the proportion of positional choices was higher when the reference group was defined as friends or colleagues as compared to society.[7] The results are presented in *Table 5*. *Column 1* shows the proportion of participants who chose the positional answer when the reference group was defined as the average in society, and the total number of participants who were exposed to this treatment. *Columns 2* and *3* present corresponding results for friends and colleagues, respectively. Finally, *columns 4* - 6 display differences and significance levels.

*** p<0.001, **p<0.01, *p<0.05The results in *Table 5* clearly reject the hypothesis **H1**. A larger share of individuals displayed positional concerns when the reference group was defined as society than when the reference group was defined as friends or colleagues. With the exception of social media followers, the differences were relatively large and significant. These findings go against the finding of e.g., Clark and Senik (Clark and Senik, 2010) who found that people compare their income mostly with colleagues, and Lubbers, Kuyper, and Van Der Werf (Lubbers, Kuyper and Van Der Werf, 2009) who found that pupils intuitively choose friends as a reference point. However, neither of these studies analyzed positional *behavior*, i.e., if social comparisons incentivize people to over-consume the positional good. It is plausible that many individuals both compare relatively intensively with, and care relatively much about, people who are close to them. Choice scenarios with close reference groups may therefore trigger both positional and altruistic preferences. This, in turn creates a quandary for positional individuals: they experience a reduction in wellbeing if they have less than others, but also if they improve their own situation at the cost of their close ones. Our data on egalitarian choices showed that a larger proportion of participants chose the egalitarian option when they compared with friends and colleagues (see *Table A1* in the appendix). However, the difference was only significant in the income and work performance domains. Our explanation is therefore only partly supported by our data.

To evaluate if people expressed more positional concerns when the reference group was relevant for the domain (**H2**), we compared the share of positional answers when the reference group was constituted by friends with the share when the reference group was defined as colleagues. We hypothesized that colleagues would be a more relevant group than friends for income and work performance, and that friends would be more relevant than colleagues for social media popularity, beauty, and physical strength. However, as can be seen in *column 6* in *Table 5*, we only found significant differences in the beauty and income domains. In addition, our results suggest that participants were more positional when they compared both their level of income *and* their beauty with colleagues than with friends. In conclusion, we did not find support for the hypothesis that comparisons with colleagues and friends have heterogeneous effects on positional concerns in different domains.

3.3. Gender effects on positional preferences

In many domains, socially valued behavior and attributes differ between men and women. Our hypotheses were that men and women would be more likely to express positional concerns in traditionally male and female domains, respectively (**H3** and **H4**). We further hypothesized

[7] The results in *Table 5* are pooled across the different gender information treatments. In other words, the reference group "Friends" includes "Female friends," "Male friends," and the gender neutral "Friends." The same holds for the reference group categories "Society" and "Colleagues."

Table 10
Correlates of positional concerns. Logistic regression. Standard errors in parentheses.

	Income	Work	Physical Strength	Beauty	Soc. Media
Positional preferences					
Income		0.508***	0.513***	0.588***	0.668***
		(0.116)	(0.122)	(0.122)	(0.140)
Work performance	0.483***		0.509***	0.837***	0.100
	(0.119)		(0.115)	(0.112)	(0.138)
Phys. strength	0.470***	0.527***		0.690***	0.742***
	(0.126)	(0.115)		(0.120)	(0.141)
Beauty	0.568***	0.812***	0.705***		0.680***
	(0.125)	(0.113)	(0.120)		(0.139)
Social Media	0.716***	0.104	0.726***	0.693***	
	(0.147)	(0.139)	(0.142)	(0.140)	
Social identity factors					
Income	0.431***	0.058	0.039	0.018	-0.095
	(0.084)	(0.073)	(0.079)	(0.080)	(0.097)
Work performance	-0.139	0.041	-0.109	-0.069	0.076
	(0.072)	(0.064)	(0.069)	(0.070)	(0.085)
Gender	-0.040	-0.032	0.242**	0.128	-0.085
	(0.075)	(0.066)	(0.071)	(0.073)	(0.089)
Social popularity	0.010	0.042	0.004	0.142*	0.557***
	(0.069)	(0.062)	(0.066)	(0.067)	(0.082)
Socio-demographics					
Income (log)	0.175**	0.074	-0.007	-0.057	0.005
	(0.062)	(0.055)	(0.059)	(0.060)	(0.071)
Female	-0.151	0.249*	-1.156***	0.086	0.248
	(0.124)	(0.109)	(0.122)	(0.119)	(0.142)
Age/100	-1.257*	-0.777	-0.754	-1.022	-1.259
	(0.599)	(0.516)	(0.567)	(0.570)	(0.682)
Close-Distant comparison (ref is society)					
Colleagues	-0.937***	-0.323**	-0.473***	-0.338**	-0.172
	(0.134)	(0.122)	(0.134)	(0.129)	(0.154)
Friends	-1.217***	-0.404**	-0.500***	-0.700***	-0.260
	(0.143)	(0.123)	(0.130)	(0.137)	(0.160)
Gender information (ref is no information)					
Female	-0.854***	-0.781***	0.629***	-0.164	-0.246
	(0.153)	(0.130)	(0.129)	(0.140)	(0.167)
Male	-0.198	-0.426***	0.196	0.279*	0.244
	(0.137)	(0.124)	(0.136)	(0.129)	(0.151)
Constant	-1.776***	-1.178**	-0.823	-0.900*	-2.122***
	(0.458)	(0.409)	(0.434)	(0.441)	(0.534)
N	2018	2018	2018	2018	2018
Chi-square	326.02	206.59	316.36	275.74	202.25
Pseudo r-square	0.1451	0.0812	0.1325	0.1187	0.1144

*** p<0.001.
**p<0.01.
* p<0.05.

that comparisons with people of the same gender would trigger more positional choices, than comparisons with members of the opposite sex (**H5**).

We present our results for hypotheses **H3** and **H4** in *Table 6* and *Table 7*, below.[8] *Table 6* shows the proportions of men and women, respectively, who chose the positional alternative in the five different domains. We separate between traditionally male (physical strength, income, and work performance) and female (beauty and social popularity) domains. The last column of the table shows differences between the shares of positional answers. We evaluated if the differences were significant by use of proportion tests. *Table 7* displays the results of a set of random effects logistic regressions on the male, female, and full sample, respectively. In these regressions, we made use of the panel structure of our data and tested for the effect of gender stereotypes. We operationalized the latter by including a dummy variable, which took the value one if the domain was stereotypically male and zero otherwise.

As can be seen in *Table 6*, our results suggest that the proportion of positional men was larger than the corresponding proportion of women in the domains physical strength (p<0.001) and income (p=0.005). Our within-group analysis (i.e., comparing women to women, and men to men. See *Table A4* in the appendix) further shows that women in our sample expressed significantly more positional concerns for beauty (25.5 percent) than they did for physical strength (16.9 percent, p<0.001) and income (21.3 percent, p=0.021). By contrast, men were significantly less positional about beauty (26.8 percent) than they were about physical strength (36.0 percent, p<0.001) and work performance (32.1 percent, p=0.001). These results lend some support to hypotheses **H3** and **H4**.

However, we also found evidence that went against our hypotheses. First, we found no differences between men and women in the domains work performance (p=0.673), beauty (p=0.520), and social media followers (p=0.636). Second, our within-group analysis showed that the proportion of women who were positional about work performance (33.0 percent) was larger than the proportion of women positional about beauty (25.5 percent, p<0.001. See *Table A4* in the appendix). Finally, the proportion of men who were positional about beauty was equal to the proportion positional about income (26.8 percent). It is perhaps especially noteworthy that our results indicated that men were equally likely to be positional about beauty as women, and that women

[8] The results in *Tables 6* and *7* are pooled across gender information treatments. These tables show if men (women) are more positional in stereotypically male (female) domains than in non-gender stereotypical domains, and if men are more or less positional than women in the different domains. We test if the gender of the reference group (e.g., Female friends) affects positional choices in *Tables 8* and *9*.

expressed positional concerns for work performance to the same extent as men did. The results of our panel data analysis are presented in *Table 7* below.

Table 7 shows that men were significantly more likely to be positional in male stereotypical domains (*column 3*) than women were. However, our analysis also shows that both men and women were more likely to be positional in traditionally male than female domains (*columns 1 and 2*). Furthermore, the insignificant coefficient on the male dummy in *column 3* suggests that men and women were equally likely to be positional in female domains. These findings go against hypotheses **H3** and **H4**, and suggest that positional preferences among men and women do not conform to gender stereotypes. It thus seems that not all preferences are gendered.

Hypothesis **H5** predicted that participants would be more likely to choose the positional alternative when they compared with people of their own gender. *Table 8* (male sample) and *Table 9* (female sample) present results from our tests of this hypothesis (proportion tests). Since we randomized the gender information treatment both between and within the participants, the number of observations differed between domains.[9] In summary, our data provided mixed support for hypothesis **H5**.

The results in *Table 8* show that men were more likely to choose the positional alternative if they compared their income ($p<0.001$), work performance ($p<0.001$), beauty ($p<0.001$), and social media followers ($p<0.001$) with other men than with women. As can be seen in *Table 9*, we further found that a larger proportion of women displayed positional concerns for beauty ($p=0.073$) and physical strength ($p=0.010$) when they compared with other women than when they compared with men. However, we found no effects of gender information on positional choices among women in the other domains, and no evidence that a male reference group made men more positional for physical strength than a female reference group did ($p=0.376$). Finally, we found that a *smaller* proportion of both men and women displayed positional preferences when they compared income and work performance with women than when they compared with a gender-neutral reference group ($p<0.001$). The result that women are substantially more likely to express positional concerns when they compare their income and work performance with an unspecified "other," than when they compare with men or women, is very surprising. A possible explanation is that gender information makes the reference group less abstract, and therefore adds a cost to positional choices. In other words, that women express more positional concerns when they compare with an anonymous "other" for the same reason that participants make more positional choices when they compare with an average person in society.

Our result on physical strength can perhaps be explained both by the fact that men, on average, have more muscle mass than women, and by gender norms. Masculine men are expected to be relatively stronger and larger than women, and feminine women are expected to be relatively weaker and smaller than men. Situations where men are relatively weaker than women may therefore threaten the self-image of both men and women. As a consequence, the relative attractiveness of the positional alternative may have been higher for men and lower for women when the reference group consisted of the opposite sex than when it consisted of members of the same sex. This explanation is partly supported by the results in *Table A3* in the appendix, which show that women were more likely to choose the absolute and inferior alternative when they compared physical strength with men than with women. A potential explanation for why we do not see similar results in the domains income and work performance is perhaps that these domains are not as gender stereotypical as they once were.

[9] The distributions of answers across all alternatives (absolute, egalitarian, etc.) and gender information treatments are available in and *A3* in the appendix.

3.4. Positional concerns and social identification

Our last hypothesis **H6**, was that people are more likely to be positional when the activity or consumption is central to their social identity. We created our measurement instruments for social identity by calculating factor scores from confirmatory factor analyses of the Leach et al. (Leach et al., 2008) questions. Our analysis showed that all instruments had a Cronbach's alpha above 0.7, and a Keiser-Meyer-Olkin (KMO) test-value above 0.7 (see *Table A5* in the appendix).

To test if the degree of social identification with a domain was associated with positional concerns in that domain, we ran logistic regressions on each of our positionality variables. We present the results in *Table 10*. It should be noted that we only elicited positional preferences for a marginal degree of positionality corresponding to 0.33. Hence, our data does not allow us to analyze the correlation between social identification and the degree of positionality. Instead the results in *Table 10* show the link between social identification and the probability that an individual has a marginal degree of positionality of at least 0.33.

Our analysis suggests that centrality of income in a participant's social identity predicted positional preferences for income, holding positionality in all other domains constant. None of the other identity variables predicted positional preferences in the income domain. We similarly find that centrality of gender and social popularity predicted positionality for physical strength and followers on social media, respectively. We found no significant correlation between a strong work identity and positional concerns for work performance, or between gender and beauty.

The last result is partly explained by gender effects. *Tables A6* and *A7* in the appendix show results from regressions on the male and female subsample, respectively. The results show that women, who felt that being a woman is a central part of their identity, were more likely to be positional about beauty ($p=0.027$), but not about physical strength ($p = 0.925$). By contrast, men who identified strongly as men were more likely to be positional about physical strength ($0<0.001$), but not about beauty ($p = 0.546$).

Finally, we note that our study replicates previous findings in terms of a positive correlation in positional preferences across domains. The regression results further show that the treatment effects of social closeness and gender information were robust to the inclusion of control variables.

4. Discussion

Why do people care more about social status in some domains than others, and does the intensity of positional concerns depend on with whom people compare? The purpose of this study was to evaluate the role of the reference group and social identification for positional preferences. We hypothesized that positional concerns are linked to the fact that social rank is associated with an evolutionary advantage. We predicted that subjects would be more likely to express positional concerns when they compare with a socially close and relevant reference group than when they compare with a more abstract and distant reference group. We further theorized that people would be most likely to be positional in domains that are closely connected to valued social identities. Finally, we predicted that men and women would compete more with members of the same sex, and be most positional in gender stereotypical domains, especially when they identify strongly with their gender. We tested our hypotheses on a sample of 2 018 participants recruited via Prolific Academics. We randomized social closeness (society, colleagues, and friends) and gender information (male, female, and no gender information) across all hypothetical choice experiments. In summary, we only found limited support for our hypotheses.

Perhaps most notably, our results suggested that subjects were most likely to express positional concerns when they compared with an average person in society, regardless of domain. This result goes against the finding of e.g., Clark and Senik (Clark and Senik, 2010) who found

that people compare their income mostly with colleagues, and Lubbers, Kuyper, and Van Der Werf (Lubbers, Kuyper and Van Der Werf, 2009) who found that pupils intuitively choose friends as a reference point. However, neither of these studies investigated positional behavior. Hence, a possible explanation of our result is that people compare more with, but also care more about, people close to them. This may trigger both positional and altruistic preferences. As a consequence, people may refrain from making choices that would hurt close reference groups. Our data on egalitarian choices added some support for this explanation.

Our analysis related to gender stereotypes partly supported our hypotheses but also indicated that not all domains are gendered. In support of our hypotheses, our within-group analysis showed that men were more positional for physical strength than for beauty, while the opposite held true for women. Our between-group analysis further indicated that men were more positional than women about physical strength and income. Positional preferences for physical strength and beauty were also positively correlated with a strong gender identity among men and women, respectively. Finally, we found that women were most likely to express positional concerns for beauty when they compared with other women. However, our analysis also produced several results that went against our hypotheses. For example, we found that women were more positional about work performance than about beauty. Our results also showed that women were equally likely to be positional about work performance (traditional masculine domain) as men, and that men were equally likely as women to be positional about beauty (traditional feminine domain). Finally, we found that men were as positional about beauty as they were about income. A potential explanation of these last two findings is that physical appearance can affect outcomes on both the marriage and labor market (Hamermesh and Abrevaya, 2013). In accordance with our results, Hamermesh (Hamermesh and Abrevaya, 2013) found that beauty had relatively large and similar effects on the happiness of both men and women. About half of the increase in well-being was explained by improved outcomes on the marriage and job market. Taken together, our results indicate that some gender stereotypical characteristics continue to be important signals of status and induce same-sex competition. However, other domains, which have traditionally been male- or female-dominated, may today be more or less gender neutral.

Our last hypothesis was that people are more likely to care about social status if the domain is linked to a central social identity. Our analysis provided mixed support for this hypothesis. As noted above, we found a significant link between gender identities and positional concerns in strongly gender stereotypical domains. We also found a significant link between social identification and positional preferences for income and social media followers. However, individuals who considered performance at work as an important part of their identity were no more likely to express positional concerns than individuals who deemed this aspect to be unimportant. This result is especially surprising, since our data suggested that work performance is a highly positional domain. A possible explanation for this finding is that relative work performance affects e.g., the probability of getting a raise, a promotion, or good references for future work applications. Positional choices in this domain may therefore have been driven both by aspirations for social status and by competition for scarce material resources. This explanation is in line with the hypotheses and findings by Hillesheim and Mechtel (Hillesheim and Mechtel, 2011) who argued that positional choices in many situations can be explained by non-psychological externalities, i.e., that a relatively better social position affects access to resources in absolute terms.

To avoid that the participants choose the positional alternative for non-positional reasons, choice experiments on positional preferences always include information to participants that everything except the value of consumption is identical in all scenarios. The consumption value in the positional alternative (B) is further always set strictly lower than the value in the absolute alternative (A). However, this approach may not prevent participants from perceiving that the characteristics of the different alternatives will indirectly affect current access to other material resources, or future access to the good in question. Concerning work performance, it is possible that our participants felt that their relative performance might affect their future prospects. If they did, then even non-positional participants without a strong professional identity had incentives to choose the positional alternative. Although inconsistent with our specific hypothesis, this explanation is consistent with our overarching hypothesis, i.e., that the quest for social status can be linked to the striving to survive.

The evolutionary source of positional preferences may perhaps also explain why participants were less likely to choose the positional alternative when they compare with a socially close reference group than with a distant one. Even if people evaluate their social rank in their social group by comparing with people close to them, their survival chances also increase if the rank of their social group is relatively high in society. Hence, if an individual improves their social rank within the group but the performance of the group lowers this may lower overall survival chances. If positional behavior reflects a general struggle over resources, and that agents use all means to get these resources (their social network, their physical appearance, etc.), this implies that positional choices may increase the survival chances of the fittest. Positional preferences will always create negative externalities since the consumption choices of others enter the utility function of positional agents. However, if an agent's relative position gives her a survival advantage, in the form of access to material and reproductive resources, it is not certain that reducing positional choices improves overall efficiency.[10]

5. Limitations and implications for future research

The main aim of this study was to test the hypothesis that socially close and relevant referent groups trigger more positional choices than distant and abstract reference groups. We thus designed our experiment to identify differences in effects between different reference groups, and not to find detailed mechanisms underlying the social struggle, or the consequences of this struggle. Our data therefore does not allow us to test hypotheses related to altruistic preferences towards peers, or efficiency gains from positional competition. Another drawback of our design is that we used hypothetical decision making to tease out preferences. This methodology has its challenges as individuals are likely to overestimate their preferences and willingness to pay (Murphy, Allen, Stevens and Weatherhead, 2005). We need to take this bias into account when evaluating the applicability and validity of our findings.

It should also be noted that the respondents' own real-life circumstances may have affected their choices in the hypothetical choice scenarios. In our experimental analysis, where we analyzed effects of randomly assigned treatments, unobserved individual heterogeneity is relatively unproblematic. However, it is possible that participants, who in real life had a low level of beauty, work performance etc., downplayed both the importance of these characteristics in their overall identity, and the importance to "perform" relatively well in these domains, to avoid negative emotions. As a consequence, the respondents' own circumstances may be systematically correlated with both social identification and positional preferences, and the correlational results in *section 3.4* may therefore be biased.[11] However, in a follow-up study, one of the authors of this study included both questions on real-life characteristics and experimentally varied the level in the hypothetical scenarios. She found no significant effects (Mageli, 2021).

We see two important areas for future research: 1) the development of more elaborate theoretical models that allow researchers to analyze under what conditions relative concerns increase or reduce market efficiency, and 2) empirical tests of these models. To enable this, more detailed empirical research is needed on the question of with whom

[10] We are thankful to an anonymous reviewer for pointing this out.
[11] We are thankful to an anonymous referee for pointing this out.

people compete for social status, why, and how this affects their behavior.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendices

A.1. Survey measures

A1.1. Positionality domains

A1.1.1. Income. The alternatives represent monthly income before tax.

In which of these states of the world do you think that you would feel most satisfied?

A **Your** monthly wage before taxes is **USD 6 300**. *$(parameters.t1)* earn on average **USD 7 900**.
B **Your** monthly wage before taxes is **USD 5 100**. *$(parameters.t1)* earn on average **USD 4 300**.
C **Your** monthly wage before taxes is **USD 5 100**. *$(parameters.t1)* earn on average **USD 5 100**.
D **Your** monthly wage before taxes is **USD 5 100**. *$(parameters.t1)* earn on average **USD 7 900**.
E The differences between alternatives are not at all important to me.
F I don't want to answer

A.1.1.2. Work performance. Suppose that it is possible to measure work performance on a scale running from 0 to 100, where 100 is the highest work performance in the world. A high work performance can for example represent high production output or lack of errors. Assume that you face no risk of losing your job.

In which of these states of the world do you think that you would feel most satisfied?

A **Your** performance at work corresponds to **52** on the scale. *$(parameters.t1)* ' work performance on average corresponds to **65** on the same scale.
B **Your** performance at work corresponds to **42** on the scale. *$(parameters.t1)* ' work performance on average corresponds to **35** on the same scale.
C **Your** performance at work corresponds to **42** on the scale. *$(parameters.t1)* ' work performance on average corresponds to **42** on the same scale.
D **Your** performance at work corresponds to **42** on the scale. *$(parameters.t1)* ' work performance on average corresponds to **65** on the same scale.
E The differences between alternatives are not at all important to me.
F I don't want to answer

A.1.1.3. Beauty. Suppose that it is possible to measure beauty on a scale running from 0 to 100, where 100 is the highest beauty in the world. High beauty can for example represent symmetrical facial features.

Table A1
Share of answers for all categories. Proportion tests of the effect of reference groups.

	Share of answers			Differences		
	Distant	Close				
Domain	Society (S)	Friends (F)	Colleagues (C)	S-F	S-C	F-C
Income						
Absolute	0.232	0.330	0.272	-0.098***	-0.040	0.058*
Positional	0.376	0.150	0.200	0.226***	0.176***	-0.049*
Egalitarian	0.302	0.422	0.436	-0.120***	-0.133***	-0.014
Inferior	0.033	0.026	0.018	0.007	0.015	0.008
N observations	668	533	817			
Work performance						
Absolute	0.215	0.249	0.235	-0.034	-0.020	0.014
Positional	0.385	0.292	0.302	0.093***	0.083***	-0.010
Egalitarian	0.307	0.361	0.372	-0.054*	-0.064*	-0.010
Inferior	0.023	0.012	0.011	0.012	0.012	0.000
N observations	641	675	702			
Physical strength						
Absolute	0.212	0.245	0.237	-0.033	-0.025	0.008
Positional	0.345	0.243	0.251	0.102***	0.094***	-0.008
Egalitarian	0.263	*0.302*	*0.296*	-0.038	-0.033	0.006
Inferior	0.053	0.043	0.040	0.010	0.013	0.003
N observations	646	723	649			
Beauty						
Absolute	0.199	0.293	0.249	-0.093***	-0.050*	0.043
Positional	0.329	0.196	0.264	0.133***	0.065**	-0.068**
Egalitarian	0.286	*0.321*	*0.308*	-0.035	-0.022	0.013
Inferior	0.044	0.029	0.030	0.015	0.014	-0.001
N observations	657	663	698			
Social media followers						
Absolute	0.115	0.148	0.129	-0.033	-0.014	0.019
Positional	0.181	0.140	0.154	0.041*	0.027	-0.014
Egalitarian	0.143	*0.156*	*0.179*	-0.013	-0.037	-0.023
Inferior	0.081	0.063	0.088	0.018	-0.007	-0.025
N observations	714	635	669			

*** $p<0.001$.
**$p<0.01$.
* $p<0.05$.

In which of these states of the world do you think that you would feel most satisfied?

A **Your** beauty corresponds to **52** on the scale. *$(parameters.t1)'* beauty on average corresponds to **65** on the same scale
B **Your** beauty corresponds to **42** on the scale. *$(parameters.t1)'* beauty on average corresponds to **35** on the same scale
C **Your** beauty corresponds to **42** on the scale. *$(parameters.t1)'* beauty on average corresponds to **42** on the same scale
D **Your** beauty corresponds to **42** on the scale. *$(parameters.t1)'* beauty on average corresponds to **65** on the same scale
E The differences between alternatives are not at all important to me.
F I don't want to answer

A.1.1.4. Physical strength. Suppose that it is possible to measure physical strength on a scale running from 0 to 100, where 100 is the highest physical strength in the world. A high physical strength can for example represent the ability to lift heavy weights.

In which of these states of the world do you think that you would feel most satisfied?

A **Your** physical strength corresponds to **52** on the scale. *$(parameters.t1)'* physical strength on average corresponds to **65** on the same scale
B **Your** physical strength corresponds to **42** on the scale. *$(parameters.t1)'* physical strength on average corresponds to **35** on the same scale
C **Your** physical strength corresponds to **42** on the scale. *$(parameters.t1)'* physical strength on average corresponds to **42** on the same scale
D **Your** physical strength corresponds to **42** on the scale. *$(parameters.t1)'* physical strength on average corresponds to **65** on the same scale
E The differences between alternatives are not at all important to me.
F I don't want to answer

A.1.1.5. Social media followers. Suppose that you have access to information on how many followers people have on social media accounts, such as for example Instagram and Twitter.

In which of these states of the world do you think that you would feel most satisfied?

A You have **800** followers on your main social media account. *$(parameters.t1)* on average have **1000** followers on their main social media account.
B You have **650** followers on your main social media account. *$(parameters.t1)* on average have **550** followers on their main social media account.
C You have **650** followers on your main social media account. *$(parameters.t1)* on average have **650** followers on their main social media account.
D You have **650** followers on your main social media account. *$(parameters.t1)* on average have **1000** followers on their main social media account.
E The differences between alternatives are not at all important to me.
F I don't want to answer

[$(parameters.t1)]

Randomized between participants. T1 remains constant within a question (e.g., income) but varies between questions, i.e., a single participant can answer a question where the reference group is 'friends' concerning income, and 'female colleagues' concerning beauty.

- *Your friends*
- *Your colleagues*

Table A2
Male sub-sample. Share of answers for all categories. Proportion tests of effects of gender information.

	Share of answers			Differences		
	Same gender (S)	Opposite gender (O)	No info (N)	(S)-(O)	(S)-(N)	(O)-(N)
Income						
Absolute	0.325	0.304	0.354	0.021	-0.029	-0.050
Positional	0.318	0.155	0.301	0.162***	0.017	-0.146***
Egalitarian	0.231	0.439	0.261	-0.208***	-0.030	0.179***
Inferior	0.029	0.020	0.036	0.009	-0.007	-0.015
N observations	277	296	591			
Work performance						
Absolute	0.287	0.289	0.265	-0.002	0.022	0.024
Positional	0.330	0.236	0.358	0.094*	-0.028	-0.122***
Egalitarian	0.301	0.331	0.295	-0.030	0.007	0.036
Inferior	0.018	0.011	0.022	0.007	-0.004	-0.011
N observations	279	284	601			
Physical strength						
Absolute	0.226	0.186	0.274	0.040	-0.048	-0.088**
Positional	0.398	0.434	0.304	-0.037	0.094**	0.130***
Egalitarian	0.265	0.169	0.252	0.096**	0.013	-0.083**
Inferior	0.025	0.021	0.039	0.004	-0.014	-0.018
N observations	279	290	595			
Beauty						
Absolute	0.262	0.401	0.280	-0.139***	-0.018	0.121***
Positional	0.355	0.169	0.266	0.187	0.090**	-0.097**
Egalitarian	0.234	0.221	0.280	0.013	-0.046	-0.059
Inferior	0.028	0.060	0.043	-0.032	-0.015	0.017
N observations	321	267	576			
Social media followers						
Absolute	0.117	0.207	0.133	-0.090**	-0.015	0.075**
Positional	0.225	0.120	0.149	0.105***	0.076**	-0.029
Egalitarian	0.133	0.120	0.138	0.013	-0.005	-0.018
Inferior	0.083	0.104	0.091	-0.021	-0.008	0.013
N observations	315	299	550			

*** $p<0.001$.
**$p<0.01$.
* $p<0.05$.

Table A3
Female sub-sample. Share of answers for all categories. Proportion tests of effects of gender information.

	Share of answers			Differences		
	Same gender (S)	Opposite gender (O)	No info (N)	(S)-(O)	(S)-(N)	(O)-(N)
Income						
Absolute	0.244	0.117	0.203	0.128***	0.041	-0.086**
Positional	0.139	0.155	0.276	-0.017	-0.137***	-0.120***
Egalitarian	0.512	0.680	0.428	-0.168***	0.084*	0.251***
Inferior	0.029	0.015	0.016	0.014	0.013	-0.001
N observations	209	206	439			
Work performance						
Absolute	0.209	0.142	0.175	0.067	0.034	-0.033
Positional	0.233	0.251	0.418	-0.019	-0.186***	-0.167***
Egalitarian	0.414	0.512	0.350	-0.098*	0.063	0.161***
Inferior	0.014	0.019	0.007	-0.005	0.007	0.012
N observations	215	211	428			
Physical strength						
Absolute	0.155	0.329	0.202	-0.174***	-0.047	0.127***
Positional	0.226	0.130	0.157	0.095**	0.069*	-0.026
Egalitarian	0.425	0.256	0.375	0.169***	0.049	-0.119**
Inferior	0.049	0.121	0.045	-0.072**	0.004	0.076***
N observations	226	207	421			
Beauty						
Absolute	0.142	0.166	0.191	-0.024	-0.048	-0.025
Positional	0.312	0.232	0.238	0.080	0.074*	-0.005
Egalitarian	0.358	0.370	0.388	-0.012	-0.030	-0.019
Inferior	0.018	0.024	0.024	-0.005	-0.005	0.000
N observations	218	211	425			
Social media followers						
Absolute	0.128	0.091	0.101	0.037	0.028	-0.009
Positional	0.151	0.151	0.158	0.001	-0.007	-0.008
Egalitarian	0.183	0.242	0.177	-0.059	0.006	0.065
Inferior	0.073	0.018	0.072	0.055**	0.001	-0.054**
N observations	218	219	417			

*** $p<0.001$.
** $p<0.01$.
* $p<0.05$.

Table A4
Differences in shares of positional answers between male and female domains, in absolute values. Within-group comparisons (Wilcoxon signed-rank tests).

	Stereotypically female domains			
	Beauty		Social media followers	
	Males	Females	Males	Females
Stereotypically male domains				
Physical strength	0.092***	0.086***	0.198***	0.014
Income	0.000	0.042**	0.106***	0.058***
Work performance	0.053***	0.075***	0.159***	0.175***

***$p<0.001$.
**$p<0.01$.
*$p<0.05$.

Table A5
Descriptive statistics for factor scores from confirmatory factor analysis.

Social Identity Factor	Obs	Mean	Std. Dev.	Min	Max	KMO	Cronbach's alpha
Income	2018	0.000	0.870	-2.491	1.656	0.746	0.786
Work performance	2018	0.000	0.911	-2.417	1.344	0.773	0.819
Gender	2018	0.000	0.887	-2.246	1.338	0.704	0.746
Social popularity	2018	0.000	0.947	-1.599	2.152	0.852	0.915

Table A6
Correlates of positional preferences. Logistic regression. Male subsample. Standard errors in parentheses.

	Income	Work	Phys strength	Beauty	Soc. Media
Positional preferences					
Income		0.413**	0.492**	0.448**	0.647***
		(0.149)	(0.149)	(0.159)	(0.181)
Work performance	0.384*		0.354*	1.000***	0.391*
	(0.154)		(0.144)	(0.150)	(0.180)
Phys. strength	0.528**	0.349*		0.878***	0.837***
	(0.154)	(0.143)		(0.151)	(0.178)
Beauty	0.489**	0.926***	0.866***		0.451*
	(0.163)	(0.147)	(0.149)		(0.185)
Social Media	0.672***	0.359*	0.831***	0.464*	
	(0.188)	(0.178)	(0.178)	(0.188)	
Social identification					
Income	0.356**	0.151	0.056	0.047	-0.047
	(0.109)	(0.099)	(0.098)	(0.109)	(0.130)
Work performance	-0.036	-0.069	-0.160	-0.048	0.197
	(0.097)	(0.089)	(0.089)	(0.098)	(0.119)
Gender	0.021	-0.021	0.334***	0.057	-0.006
	(0.093)	(0.085)	(0.085)	(0.095)	(0.115)
Social Media	-0.032	0.022	0.053	0.140	0.465***
	(0.087)	(0.080)	(0.080)	(0.088)	(0.105)
Socio-demographics					
Income (log)	0.179*	-0.004	-0.072	0.007	0.004
	(0.078)	(0.071)	(0.071)	(0.079)	(0.091)
Age/100	-1.501	-0.407	-0.512	-1.603	-1.098
	(0.808)	(0.719)	(0.714)	(0.819)	(0.934)
Close-Distant comparison (ref is society)					
Colleagues	-1.033***	-0.349*	-0.454**	-0.400*	-0.232
	(0.174)	(0.162)	(0.165)	(0.175)	(0.206)
Friends	-1.297***	-0.306	-0.522**	-0.818***	-0.169
	(0.101)	(0.164)	(0.159)	(0.183)	(0.208)
Gender information (ref is no information)					
Female	-0.831***	-0.632***	0.672***	-0.640**	-0.341
	(0.197)	(0.173)	(0.161)	(0.204)	(0.227)
Male	0.164	-0.197	0.356*	0.504**	0.504**
	(0.173)	(0.163)	(0.164)	(0.167)	(0.194)
Constant	-1.711**	-0.801	-0.470	-1.196*	-2.290**
	(0.578)	(0.529)	(0.523)	(0.577)	(0.685)
N	1164	1164	1164	1164	1164
Chi-square	194.75	119.26	176.03	202.13	132.71
Pseudo r-square	0.1439	0.0816	0.1158	0.1494	0.1285

*** p<0.001.
**p<0.01.
* p<0.5.

- *Your female friends*
- *Your male friends*
- *Your female colleagues*
- *Your male colleagues*
- *In society, people*
- *In society, females*
- *In society, males*

A.1.2. Social identity

A.1.2.1. Self-belonging. To what extent do you agree with the following statements? (1 = strongly disagree, 6 = strongly agree, NA = no answer)

- I often think about the fact that I am a **[your profession]**

- I often think about the fact that I belong to a certain **income group**

- I often think about the fact that I am a **[your gender]**

- I often think about the fact that I have a certain level of **social popularity**

A.1.2.2. Self-identity. To what extent do you agree with the following statements? (1 = strongly disagree, 6 = strongly agree, NA = no answer)

- The fact that I am a **[your profession]** is an important part of my identity

- The fact that I belong to a certain **income group** is an important part of my identity

- The fact that I am a **[your gender]** is an important part of my identity

- The fact that I have a certain level of **social popularity** is an important part of my identity

A.1.2.3. Self-image. To what extent do you agree with the following

Table A7
Correlates of positional preferences. Logistic regression. Female subsample. Standard errors in parentheses.

	Income	Work	Phys strength	Beauty	Soc. Media
Positional preferences					
Income		0.691***	0.563*	0.783***	0.669**
		(0.193)	(0.221)	(0.197)	(0.229)
Work performance	0.643***		0.728***	0.657***	-0.277
	(0.192)		(0.198)	(0.177)	(0.227)
Phys. strength	0.469*	0.796***		0.457*	0.576*
	(0.226)	(0.203)		(0.214)	(0.247)
Beauty	0.764***	0.654***	0.434*		0.975***
	(0.202)	(0.180)	(0.215)		(0.215)
Social Media	0.760**	-0.242	0.576*	1.005***	
	(0.240)	(0.227)	(0.250)	(0.218)	
Social identification					
Income	0.546***	-0.096	0.025	-0.073	-0.161
	(0.135)	(0.112)	(0.137)	(0.121)	(0.150)
Work performance	-0.252*	0.171	-0.064	-0.023	-0.015
	(0.110)	(0.095)	(0.115)	(0.102)	(0.127)
Gender	-0.193	-0.002	0.012	0.268*	-0.292*
	(0.130)	(0.108)	(0.132)	(0.121)	(0.146)
Social Media	0.089	0.110	-0.085	0.153	0.704***
	(0.116)	(0.101)	(0.124)	(0.108)	(0.135)
Socio-demographics					
Income (log)	0.208*	0.198*	0.127	-0.156	0.054
	(0.104)	(0.089)	(0.108)	(0.008)	(0.116)
Age/100	-0.933	-1.204	-1.691	-0.457	-0.021*
	(0.919)	(0.464)	(0.993)	(0.)	(0.010)
Close-Distant comparison (ref is society)					
Colleagues	-0.787***	-0.316	-0.499*	-0.304	-0.157
	(0.217)	(0.190)	(0.236)	(0.197)	(0.239)
Friends	-1.093***	-0.579**	-0.457*	-0.628**	-0.384
	(0.237)	(0.194)	(0.232)	(0.215)	(0.257)
Gender information (ref is no information)					
Female	-0.868***	-0.954***	0.516*	0.356	-0.090
	(0.247)	(0.201)	(0.220)	(0.201)	(0.250)
Male	-0.824**	-0.779***	-0.173	-0.063	-0.134
	(0.242)	(0.196)	(0.236)	(0.216)	(0.249)
Constant	-2.316**	-1.529*	-2.475**	-0.380	-1.803*
	(0.751)	(0.634)	(0.785)	(0.688)	(0.839)
N	854	854	854	854	854
Chi-square	146.34	110.22	67.53	111.49	91.96
Pseudo r-square	0.1643	0.1017	0.0871	0.1149	0.1251

*** p<0.001.
**p<0.01.
* p<0.5.

statements? (1 = strongly disagree, 6 = strongly agree, NA = no answer)

- Being a **[your profession]** is important for how I see myself

- Having a certain **level of income** is important for how I see myself

- Being a **[your gender]** is important for how I see myself

- Having a certain level of **social popularity** is important for how I see myself

A.1.2.4. Self-confidence. How important are the following things for how you feel about yourself (your self-esteem)? (1 = not important at all, 6 = very important, NA = no answer)

- Your performance at **work**

- Your level of **income**

- Your level of **physical attractiveness**

- Your level of **social popularity**,

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