The Aspirational Income Hypothesis:
On the Limits of the Relative Income Hypothesis

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1. Julius Caesar vs. Groucho Marx

Since Duesenberry (1948), economists have repeated fallen back to safety and reliability of the relative income hypothesis in a wide range of economic discussions ranging from labor economics to happiness to inequality. While the behavioral model stemming from the relative income hypothesis illustrates a robust and intuitive form of human behavior and preferences, there are several gaping holes that the model cannot explain. Most notably is the prediction, made by the relative income hypothesis, that people prefer to be in comparison groups where they are the highest earners. However, simple observations and a little introspection reveal that we often are observed violating this prediction, choosing to apply to and go to colleges, jobs, clubs, populated by people known to be of higher status, ability, and wealth than ourselves. In this paper we propose a model and a laboratory experiment of the "aspirational income hypothesis"—where we identify aspiration as a simultaneous but countervailing motivation that works alongside the relative income effect to drive individuals in their choice to endogenously choose comparison groups that are "higher" or "lower" in comparison to oneself. Our laboratory experiment demonstrates robust evidence of the existence of the aspiration income effect. We see individuals, all else equal, prefer to be compared to groups that are higher earning and better performing than themselves. We see that adding in a competitive relative performance pay procedure shifts a population in the direction predicted by the relative income hypothesis, but that the aspirational income effect remains strong enough to lead a significant proportion of people, even in the face of losses, to prefer groups where comparisons are upwards towards higher performing peers rather than downwards.

The distinction between the aspirational and relative income hypotheses is perhaps more clearly illustrated by comparing the attitudes of two very different figures, Julius Caesar and Groucho Marx. According to Plutarch:

> In his [Caesar's] journey, as he was crossing the Alps, and passing by a small village of the barbarians with but few inhabitants and those wretchedly poor, his companions asked the question among themselves by way of mockery, if there were any canvassing for offices there; any contention which should be uppermost, or feuds of great men one against another. To which Caesar made answer seriously,

> "For my part, I had rather be the first man among these fellows than the second man in Rome." (Plutarch 2014)

Caesar's choice of a small pond (the Alpian hamlet) over a big pond (Rome) is predicted by the relative income hypothesis. According to the hypothesis, one derives utility when one compares one's income/status to a comparison group that has a lower income/status than one's own.[1] Or, symmetrically, one derives disutility when one compares one's status to a comparison group that has a higher income/status than one's own.

However, Caesar must feel at least a bit bored to be the head of a small hamlet. The hamlet does not present a challenge that can ignite one's aspiration. This feeling of boredom and the quest after ambition might explain, at least to one interpretation, Groucho Marx's famous quip: "I don't care to belong to any club that will have me as a member" (Marx 1995, p. 321). Once Groucho Marx is admitted into a club, the club must have rated him of a higher status than the club's. Groucho Marx is the small fish that prefers a big pond (higher club) over a small pond (lower club).

To capture the boredom that Caesar must feel even when he makes choices as predicted by the relative income hypothesis, but where the boredom is too strong for Groucho Marx to bear, this paper proposes the "aspirational income hypothesis":

> **The Aspirational Income Hypothesis:** One experiences a positive utility effect, called "aspirational utility," when one affiliates one's self with a group with a higher income/status than one's own. Such a group is a feather in one's cap. Conversely, the aspirational utility is negative when one affiliates with a group with a lower income/status than one's own.

So, for Caesar,

> **Julius Caesar:** relative income effect > aspirational income effect

In contrast, for Groucho Marx,

> **Groucho Marx:** aspirational income effect > relative income effect

This paper's conjecture is straightforward. Despite their countervailing (dialectical) nature, the aspirational and relative income effects coexist. If the aspirational income effect is more potent than

[1] For simplicity, this paper assumes that status is a monotonic positive function of income and, hence, uses the term "status" as a proxy of "income."

the relative income effect, the person would make a choice similar to Groucho Marx's. Otherwise, the person would make a choice similar to Caesar's.

To assert that the two effects are countervailing and coexisting means that they arise from the choice of the same club. If one choses a higher ranking club, it produces positive aspirational income effect simultaneously with negative relative income effect. If one choses a lower ranking club, it produces the opposite: negative aspirational income effect simultaneously with positive relative income effect.

The main contribution of this paper is two-fold. First, it introduces the aspirational income effect to the economics literature. It particularly connects the aspirational income effect to the familiar relative income effect. Second, we test whether the aspirational income effect does exist. This paper is the first, to our knowledge, that conducts a laboratory experiment that focuses on the interplay of the two effects. The experimental findings provide robust evidence of the existence of the proposed aspirational income effect. Further, the aspirational income effect is surprisingly much stronger than the relative income effect in our data.

Section 2 reviews the relevant literature. **Section 3** provides a conceptual framework that unifies the relative income hypothesis with the proposed aspirational income hypothesis. **Section 4** describes the experimental design. **Section 5** discusses the results of the predictions of the standard relative income hypothesis and the proposed additional aspirational income hypothesis. **Section 6** discusses whether beliefs prompts the participants to express their preferences strategically, i.e., contaminating their true preferences. **Section 7** concludes.

2. Review of the Literature

From the bird's-eye view of the literature presented below, the economics literature is the mirror image of the psychology literature. While the economics literature generally focuses on the relative income effect, the psychological literature broadly concerned with the aspirational income effect.

2.1 Aspirational Income

The hypothesized aspirational income has received little attention in the economics literature. One exception is the work of Roland Bénabou and Jean Tirole (2002, 2003). They model aspiration,

which they call "intrinsic motivation," as the outcome of one's ambiguous knowledge of one's given ability. Such ambiguity propels the actor to discover his or her own ability, leading to a series of actions that appears to us as aspiration. The drawback of this model is that aspiration should vanish once the actor discovers his or her given ability. This model does not capture aspiration as defined in this paper.

Clark et al., (2008) captures a concept similar to the aspirational income effect. They call it "internal relative income," whereas the standard relative income effect is "external relative income." This suggest that both effects spring from separate sources. But if one regards the comparison group as endogenous, as this paper does, the "external" source turns out to be no different than the "internal" source—the thesis of this paper.

Some economists have used the term "aspiration" explicitly but in a different way. For instance, Michael McBride (2010) uses the term "aspiration" to mean aspiring to have a higher income. Following the literature, he takes the comparison group as exogenous, thus aspiring to have a higher income amounts to aspiring to have an income higher than the average income of the given comparison group. One pursues such higher income only to have a superior income/status than the income/status of one's given group, effectively capturing the pursuit of the relative income effect, but not the aspirational income effect we seek.[2]

Alois Stutzer (2004) also uses the term "aspiration" to denote the opposite, viz., relative income.[3] This should not mean that no economist has attended aspirational income as defined

[2] This is clear in the way McBride sets up the experiment. He first conceives the reported subjective happiness of agent *i* at time *t* (h_{it}) as a positive function of realized income (y_{it}) and as a negative function of aspired income (a_{it}). McBride supposes that the aspired income is a linear function of three variables: the average income of past achievements, the average income of the comparison group, and the expected income. McBride designs a test that asks participants to predict whether a penny will be heads-or-tails as played by an unfair computer program. In the treatments where the frequency of *heads* is above 50%, the actors' maximizing strategy is always to guess heads. On average, 92% of the subjects made predictions consistent with expected payoff maximization. As the treatments raise the frequency of heads from 65% to 80%, the participants form higher expected payoff from following the same strategy, predicting heads. McBride finds that the single largest effect on the subject's reported satisfaction is *realized* income (y_{it}). He also finds that the income of the comparison group and the expected level had negative effects on reported satisfaction, as he conceived the experiment. Thus, he effectively captured the relative income effect.

[3] Stutzer runs an empirical test to confirm the solution offered by Richard Easterlin (1995) to the happiness paradox. Namely, how come people do not feel happier in advanced Western countries despite the rise of average wellbeing. Stutzer shows that, if we hold one's income constant, but allow one to specify his or her "aspirational income," one would choose the average income of one's comparison group as the benchmark. As the average comparison group income rises, one would feel falling behind the "aspirational income," which makes the person unhappy. And when we include the fact that one's income has risen at the same rate as the average group income, one's happiness arising from the relative effect is steady, what Easterlin observes.

here. For instance, Heckman et al. (2014; see Khalil, 2010) argue that intrinsic motivation, what they call "character," is more primary in determining one's achievement than one's cognitive skills as measured by aptitude in mathematics or language. They rigorously show that even if educational policies give young people a second chance, such as earning GED to act as equivalent to high school diploma in the US, there is no evident improvement in earnings. What is at work rather is the level of intrinsic motivation, the desire to work hard. Such intrinsic motivation, what is designated here as aspiration, can be effective only if planted as a seed in the first seven years of one's life.

The thesis of Heckman et al., (2014) resonates well rather with the thrust of the psychological literature. The psychological literature, has identified aspiration for a long time as primary to understanding intrinsic motivation. Psychologists have traditionally viewed aspiration as a goal or a benchmark that the agent sets up and uses as a context to evaluate payoffs (e.g., Hilgard, Sait, & Margaret, 1940; Lewin et al., 1944; Simon, 1959). They even incorporated aspiration in the analysis of social interaction such as prisoners' dilemma (Crowne, 1966) and the formation of coalitions (Komorita & Ellis, 1988).

Psychologists study aspiration in relation to "intrinsic motivation"— as opposed to "extrinsic motivation" that concern many economists (Deci & Flaste, 1996; Ryan & Deci, 2000; Ryan, 2014). Other psychologists study aspiration in relation to happiness or what is sometimes called "positive psychology" (see Seligman 2002, 2004, 2011; Seligman & Csikszentmihalyi, 2000; Diener & Seligman, 2009; Csikszentmihalyi, 1990; Berns, 2005; Biswas-Diener et al., 2004; Peterson, 2006; Forgeard et al., 2011; van Deurzen, 2009; Sinnott, 2013).

2.2 The Question of Relative Income

The concept of relative income is of high importance in the economics (and sociological) literature. James Duesenberry coined the expression the "relative income" hypothesis in his classic 1949 book. Duesenberry's main idea is that one's decisions about saving and consumption is not only a function of absolute income, but greatly depends on one's relative income in the income distribution. This could be the result of the Keynesian marginal propensity to consume, where such marginal propensity depends on one's absolute income.

Duesenberry's concept involves an additional dimension: How does one feel when assessing his or her wellbeing in relation to the group with whom one identifies? Duesenberry supposed that one experiences elation or utility when one compares his status to the lower status of the comparison group. Duesenberry's hypothesis can be traced back even farther to Thorstein Veblen (1899) and even earlier to John Rae (1834). It gained recent attention with Robert Frank's (1985), *Choosing the Right Pond*. As Frank notes, the hypothesis predicts that people sort themselves into leagues of sports or levels of colleges so that the members at the bottom do not suffer. But people, even when they have freedom of movement and assembly, do not sort themselves in ways that generate non-stratified, internally homogeneous groups. Frank expresses this empirical anomaly:

> And if people are free to choose their own associates …, why would anyone then agree to participate in a group in which he was a low-ranking member? (Frank, 1985, pp. 8-9).

Frank provides an answer, which he calls the market for "local status": the wages of the top producers in a firm are lower than their productivity while the wages of the low producers are higher than their productivity. This is the outcome of a market for "local status": top earners simply compensate the low earners in order for the low earners to put up with the disutility of being of lower status. The same local status market at the national level when the rich, under the eupemism of "fairness," tolerate progressive taxation. This supposed compensation may explain why low earners in firms and nations put up with being part of highly stratified organizations. But it cannot explain why low earners actively seek to live in higher ranking neighborhoods or to be associated with clubs that are of higher status than their own, i.e., where there is no supposed compensation takes place.

This paper provides an answer, the aspirational income hypothesis. People derive a sense of self-fulfilment from identifying themselves with clubs that express what they think they can potentially become. This should not deny the relative income effect, which more economists, after Easterlin's (1995) powerful use of it to explain he happiness paradox, started to pay it serious attention (e.g., McBride, 2001). For instance, economists showed that the unemployed feel happier upon learning that the unemployment rate has increased in the country (Clark & Oswald 1994; Eggers et al. 2006). Similarly, Mary Daly et al. (2011) find, after controlling for individual characteristics, suicide rate is higher among the affluent than the poor. They conclude that the only

explanation is relative income: when one belongs to a comparison group that is doing better than one's accomplishments, one must feel miserable, prompting the greater rate of suicide.

Luis Rayo and Gary Becker (2007a, b) maintain that such relative assessment is evolutionary efficient. They see happiness as a heuristic utility rescaling machine arising as a result of physical cognitive constraints. As neoclassical economists explain heuristics and habits as arising from bounded cognitive rationality, they posit that limited neural capacities hinder assessment of absolute stimuli that are difficult to rank. With the help of comparing the stimuli to a benchmark, which is the function of the relative income effect, the organism can rank the choices better. Natural selection favors organisms that have such comparison effect because it would make them fitter than organisms who lack the happiness heuristic.

Robert Frank (1999, 2012) disputes the conclusion that relative income is evolutionary efficient. Following Fred Hirsch (1977), Frank argues that the pursuit of higher relative income effect leads to inefficiency because the pursuit of relative income is "positional good": Once one achieves higher relative income, others do not stand still. They also pursue higher relative income. The outcome is the return of the old status hierarchy, but with greater costs. So, the pursuit of status is a negative-sum game, as the case in arms race.[4]

This conclusion, viz., the wastefulness of positional pursuits, was reformulated in light of the rise of happiness studies, especially the Easterlin paradox mentioned above (Easterlin et al., 2010; Layard et al., 2010; Ng, 1987; Clark et al. 2008). Given the relative income hypothesis, happiness is seen as a function of relative wellbeing. Given that relative wellbeing has been roughly steady in the past half century, happiness has not risen with the rise of absolute wellbeing. However, in light of the finding of this paper, aspiration also matters to happiness. It could hold the key to understanding future studies of happiness.

3. The Conceptual Framework

We start with the standard relative income hypothesis. We modify it to take into consideration two features:

[4] But a careful analysis—which takes into consideration that conspicuous consumption may prompt people to save for future status effect (Arrow & Dasgupta 2009)—shows that the arms race phenomenon might be over-blown: There is inter-temporal substitution between current and future conspicuous consumption, leading rational individuals to reduce current consumption.

i. People are exposed to an aspirational income effect in addition to the relative income effect;

ii. People choose the comparison group; the group is not exogenous.

We then investigate how the agent attains what is called below "symbolic utility" from comparing the self to a comparison group. Symbolic utility is called "symbolic" because it could arise even when the agent does not actually pay any fees or incur any purchases to sustain such comparison. We then analyze the consequences, via the income effect alone, of identifying with a comparison group that entails the payment of fees or incurring such consumption costs.

3.1 Justifying the 2-Step Model

Let us start with the relative income hypothesis, particularly with the model employed in the economics literature on happiness (Ng, 1987; Clark et al. 2008). Let us suppose that agent i (i=1, …, n) maximizes utility (U_i) for the current period only, and hence we can suppress the time date,

$$U_i = U(u_{1i}(Y_i), u_{2i}(Y_i/Y_j), u_{3i}(T-l_i)) \ldots (1)$$

Where U_i, u_{1i}, u_{2i}, u_{3i} are usual utility functions, assumed to be monotonic. We assume no saving since it covers only the current period. The first derivatives of the utility functions with respect to all their arguments are positive, while the second derivatives are negative.

Note, u_{1i} denotes what this paper calls "substantive utility." The utility is called "substantive" because it is a function of "substantive" goods or consumption bundles that income (Y_i) can buy. Given there is no saving, we assume all income is spent on substantive goods such as food, clothes, housing, aesthetics, and so on--except leisure. They are substantive in the sense they are the primitives of the model. We cannot break them down to more elementary or primordial elements. Similarly, u_{3i} is "substantive utility" since it is a function of the remaining substantive input, leisure (l_i), where T is the total time available for any agent.

In contrast, u_{2i} denotes another kind of utility, which can be called "comparative utility" or "non-substantive utility." This paper chooses instead the term "symbolic utility" in order to highlight sharply how it differs from substantive utility. The conceptual difference between the substantive and symbolic utilities is important: it should clarify different motives in the experimental design. The utility is called "symbolic" because it is not a function of naked or pure substantive goods that income

(Y_i) can buy. Symbolic utility is rather a function of the comparison of different substantive goods or substantive utilities. It is true that one may "buy" symbolic utility when one parades one's wealth or accomplishments or when one pays a fee to join a club. But such purchases or fee payments are not "essential" for the production of symbolic utility. To produce symbolic utility, it is simply sufficient to compare, in the imagination, one's substantive goods or utility with the substantive goods or utility of one's comparison group. Put in other words, what sets symbolic utility apart from symbolic utility is that symbolic utility basically stems from the comparison of two substantive goods/utilities: i's substantive goods/utility with the substantive goods/itility of j (j=1, …, n), viz., Y_j.

The income of j can be made up of one person's income or the average income of a cluster of persons within the n population. The discussion here is very general, where the person may take his or her own income as the benchmark (i=j) against which to compare one's income (see Khalil, 2000).

Given that u_1 and u_3 are the function of substantive goods, ranging from food to leisure, we can simplify,

$$U_i = U_i(u_{1i}(X_i), u_{2i}(X_i, X_j)) \ldots (2)$$

where X_i and X_j are the vector of the choice variables denoting substantive goods ranging from food, clothes, to housing, and leisure, consumed by i and i's comparison group, j. Given that j is exogenous, the agent can only choose X_i to maximize U_i.

There are two problems with this model. First, the $u_{2i}(X_i, X_j)$ is supposed to capture only the "relative income effect." This can be easily solved by supposing that $u_{2i}(X_i, X_j)$ additionally captures the "aspirational income effect." Given the two effects are dialectical (countervailing), $u_{2i}(X_i, X_j)$ is non-monotonic.

Second, the $u_{2i}(X_i, X_j)$ function treats j as exogenous—when in fact the agent may vary j, especially to balance the countervailing relative income effect and the aspirational income effect. This can be easily solved by supposing that one chooses comparison group j in order to vary the aspired X_j to balance the two countervailing effects.

In light of the two solutions, which are complementary, agent i chooses X_i and X_j to maximize U,

$$U_i = U_i(u_{1i}(X_i), u_{2i}(X_i, X_j)) \ldots (3)$$

$$\text{s.t. } I_i \geq PX_i + F(PX_j) \ldots (3')$$

$I_i > 0$, $P > 0$, $F \geq 0$ are given

where I_i is i's income; P the vector of prices of the X_i or X_j vector of goods; and F a rate, such as 2%. A person who wants to identify with group j, must spend resources on symbolic goods ($F(PX_j)$) to be able to identify the self with the consumption level of j.

It is possible, though, that agent i may succeed in identifying with a group, but without spending ($F(PX_j)$), i.e., consuming the symbolic clothes, cigars, shoes, or even attending the rituals and ceremonies of the comparison group. One may succeed in simply imagining that one is a part of such group, as when one admires one's heroes, viz., the high achievers in one's respective profession, and imagines their achievements as happening vicariously to his or her own station.[5]

The person derives all the additional morale boost by identifying with the higher rank, but without paying for it, can be considered as simply having strong "internal-imagination faculty." For the agent, as we will see below, who does not have such strong faculty, usually pays the fee ($F(PX_j)$), i.e., purchase the symbolic goods that act as cues to remind him or her of the club or comparison group that he or she desires.

As a first step, to distill the hypothesized aspirational income effect in a pure form, we should undertake the maximization "as if" F=0. This means that the person sufficiently relies on his her internal-imagination faculty. That is, at this first step, we should not posit that the agent must necessarily spend resources on symbolic goods in order for the person to imagine that he or she is a member of the comparison group. There is no need to have a substitution between u_1 and u_2 in the case that the agent has strong internal-imagination faculty.

We design our experimental task with two goals in mind. First, we aim to address the general setting, where the agent does not pay for actual symbolic goods in order to imagine the desired comparison group. Second, once this general setting is secured, we can examine how people change their choice of comparison group when such a choice necessarily involve cost, i.e., F>0.

So, we propose a 2-step maximization procedure, where agent i

1) First, decides on what is the best allocation of only substantive goods (X_i) "as if" F=0. This allows to identify optimal allocation of substantive goods, X^*_I;

[5] Adam Smith (1976, p. 52) calls such imagination "peculiar sympathy," distinguishes it from the usual sympathy, i.e., the compassion one feels toward others that is usually accompanied by approbation or judment. Smith, regards "peculiar sympathy" as the microfoundation of social rank in soceity. Smith laments that such social rank, although has elements of ostentation and obsequousness, is the foundation of political stability (Khalil 2003, 2005).

2) second, decides on the best j, given that $u_{2i}(X_i, X_j)$ is non-monotonic, again "as if" F=0.

One may object, though, to the 2-step maximization procedure: why not proceed in reverse—i.e., maximize first $u_{2i}(X_i, X_j)$ and then maximize u_{ii}? The answer is straightforward. The reverse procedure postpones the question: what determines the choice of a particular comparison group rather than another? If we posit that agents select the comparison group arbitrarily, we might be actually providing a special model of toxic or dysfunction emotions such as bitterness, delusion, and futility.[6]

3.2 The 2-Step Model

To avoid the issue of dysfunctional and toxic emotions, it is best to commence with Step 1. Formally, agent i chooses substantive inputs (X_i) to maximize substantive utility (u_{1i}):

$$u_{1i} = u_{1i}(X_i) \ldots (4)$$

$$\text{s.t. } I_i \geq PX_i \ldots (4')$$

Function (4) is monotonic, with positive first derivative, and negative second derivative. Let X^*_i denote the bundle that maximizes u_{1i}.

In Step 2, agent i chooses the comparison group (X_j) to maximize symbolic utility (u_{2i}):

$$u_{2i} = u_{2i}(X^*_i, X_j) \ldots (5)$$

Again, the maximization of five (5) proceeds "as if" F=0. One's symbolic "relative income" effect

[6] Bitterness usually arises when the mistaken agent aims very high, but fails to achieve the designated, highly improbable goal. The agent, then, becomes angry and bitter, blaming fate, others, and even loved ones for his or her failure (see Diamond, 1996). As for delusion, it usually arises in the case when the failing person refuses even to acknowledge failure. The delusion is needed to support the narrative of unacknowledged failed life plan, as the case of the protagonist in Arthur Miller's *Death of a Salesman*. The delusion can become pathological, when one starts to think that unrelated events in the world are actually confirming his or her own desires and beliefs of superiority, as the case of the protagonist in de Cervantes' *Don Quixote*. As for futility, the mistaken agent may succeed in achieving the lofty goal, but achieve it at unjustifiable expense. Further, the agent judges that he or she should have foreseen such expense if were not blinded by ambition. In this case, the "successful" person may experience the emotion of futility, arising basically from the anger to succumb to the temptation of ambition. Adam Smith's (1976, pp. 181-184) story of the poor man's son, who was punished by heaven with a strong taste for ambition, is a poignant illustration of futility. As Adam Smith's recounts the story of the poor man's son bedevilled by an obsession:

> The poor man's son, whom heaven in its anger has visited with ambition, when he begins to look around him, admires the condition of the rich (Smith, 1976, p. 181).

The poor man's son chose first to belong to a very high rank. He worked very hard and gave up many enjoyments in his life. Once he became a member of the desired rank, he realizes that the comforts brought by the riches were not worth all the sacrifices he has made. He basically felt there is little difference between the enjoyments of the rich and enjoyments of ordinary people who have not been visited by heaven's wrath, i.e., ambition.

is positive if one's income (X^*_i) is relatively higher than the average of the comparison group (X_j), but the opposite otherwise, as in the standard literature. At the same time, one's symbolic "aspirational income" effect is negative if one's income is relatively higher than the average of the comparison group, but the opposite otherwise. The net effect of these countervailing effect is a non-monotonic symbolic function where, holding X^*_i constant, symbolic utility (u_{2i}) rises at the beginning with the rise of X_j, but eventually declines.

So, for a given X^*_i, one chooses the optimal ranking group (X_j), which meets the first order condition.. That is, one chooses j that attains the highest point of the bell-shape u_{2i}. This should identify for us the optimum group (X^*_j) That is, X^*_j for agent i cannot be the greatest or highest-ranked j, even if it is free, because it would exasperate the relative income effect, even when one is getting a thrill from imaging one's self is associated with the highest ranking group.

In summary, the proposed 2-step maximization procedure does not take the comparison group as given, as is the case in the relative income hypothesis literature. The proposed procedure takes (X^*_i) as given by Step 1 in order to determine the optimum comparison group, X^*_j.

The proposed 2-step maximization procedure allows us to define "optimal symbolic choice":

> **Optimal Symbolic Choice:** Given $u_{2i}(X^*_i, X^*_j)$, we can define the optimal symbolic choice as PX^*_j/PX^*_i.

In this light, Groucho Marx's "optimal symbolic choice" is $PX^*_j/PX^*_i > 1$. That is Groucho Marx chose a group of a higher rank than himself because his symbolic aspirational joy of belonging to a higher group exceeds his relative pain of belonging to such group. In contrast, Julius Caesar's "optimal symbolic choice" is the contrary, $PX^*_j/PX^*_i < 1$. That is, Julius Caesar chose a group of a lower rank than himself because his symbolic relative joy of belonging to a lower group (the Alpian hamlet) exceeds the aspirational pain of belonging to such group.[7]

3.3 Expenditure on Symbolic Goods: Step 3

[7] The 2-step maximization procedure has one additional advantage. If the agent substitutes between u_1 and u_2, it would be as if the agent is buying status, ostentatious, and involved in self-aggrandizement (Khalil, 1996). If we incorporate such substitution at first approximation, we start arbitrarily loading the utility function with complex tastes ranging from pride, self-respect, to other dark emotions such as malice and envy. Many behavioral economists as well as standard economists are guilty of such arbitrary loading (e.g., Becker, 1993), leading, first, to overloading the utility function and, second, to losing a grip over the distinction between substantive tastes (the primitive tastes) and symbolic ones (the complex tastes).

Let us suppose that the person has weak internal-imagination faculty. In this case, the person wants to spend income, given F >0, on symbolic goods that reminds him or her of the optimal symbolic choice. This person needs the tangible, but costly symbolic trinkets to make one's optimal symbolic choice palatable.

In most, if not all cases actual goods are composite of substantive and symbolic components. Analytically, though, they can be separated. One may pay for a high quality good, where the marginal cost the high-quality is above its marginal substantive benefit. The difference can be treated analytically as a separate good that acts as a "pure symbolic input" in the symbolic utility. In this model, expenditures on symbolic goods to affirm one's identity with one's comparison group are treated as "pure symbolic inputs."

In the case of weak memory, agent i undertakes **Step 3**. Agent i pays the club fee, i.e., purchases symbolic goods in the sense of "pure symbolic goods." The agent chooses a new allocation in light of the fee, X^f_i & X^f_j, i.e., via respecting two constraints. the maximizing the utility function via the income effect:

$$I_i \geq PX^f_i + F(PX^f_j) \ldots (6)$$

$$(PX^f_j)/(PX^f_i) = (PX^*_j)/(PX^*_i) \ldots (7)$$

$$\text{where } I_i \geq PX^*_i$$

While constraint (6) is about the budget, constraint (7) stipulates that the new allocation must respect the "optimal symbolic choice," i.e., the optimal ratio of the consumption of the comparison group to one's own consumption. Let X^{*f}_i and X^{*f}_j denote the new optimal allocation when one decides to actually buy the club fee.

Step 3 entails that the agent is maximizing the utility function via the income effect. The agent is not maximizing the utility function via the substitution effect, which would make one look as "buying status" in the sense of being crass, vain, or ostentatious. Put differently, when one demands less symbolic goods because they have become more expensive, the change is not the result of the substitution effect, as if one is maximizing function (3) by substituting u_{1i} and u_{2i}. Rather, the change is prompted via the income effect, where the agent is lowering the consumption of substantive and symbolic goods at the same rate.

As a result of Steps 1-3, we have the "realized" aggregate utility (U^a):

$$U^a_i = U^a_i\,(u_{1i}(X^*_i),\, u_{2i}(X^{*f}_i/X^{*f}_j)) \quad \ldots (8)$$

where such function acts as an accounting tool and, hence, should not be confused with the objective function.

3.4 Two Experimental Goals

The rest of the paper undertakes our two experimental goals. Experimental goal #1 deals with the central research question of this paper: does the aspirational income effect, i.e., $PX^*_j/PX^*_i > 1$, exist even when $F = 0$? To undertake experimental goal #1, the aspirational income effect must be potent enough to offset its opposite effect, the relative income effect. That is, at the extensive margin, the world is populated with people more like Groucho Marx than Julius Caesar.

Secondly we ask: is the demand for X^*_j sensitive to price, i.e., when $F>0$? In our design, the rise of price takes place via expected income. So, there is no room for the substitution effect to take place, confirming the proposed 2-step maximization model.

4. Experimental Design

Each participant in our experiment participated in one of three treatments. Each treatment consisted of two phases. In all treatments subjects knew they had a 50/50 chance of being paid for the outcome of the first phase, where participants were alone, or the second phase, where subjects were placed in endogenously formed groups, each made up of five participants. The first phase, a solitary real-effort task, was identical across treatments while the second phase varied slightly across treatments.

As Table 1 shows, the second phase varied along two dimensions between treatments. Along the vertical dimension, treatments were varied according to whether the second phase payments were based solely upon either one's absolute performance or one's performance relative to one's chosen group. Along the horizontal dimension, treatments were varied according to whether or not participants were told of the average performance of their group on the second phase

	Participants were not informed of the average performance of their group in phase 2	**Participants were informed of the average performance of their group in phase 2**
Each participant was paid based on one's absolute performance in phase 2	Treatment 1	Treatment 2
Each participant was paid based on one's relative performance in phase 2	N/A (participants would know from their pay about their performance)	Treatment 3

Table 1: Three Treatments

real-effort task.

The relative pay treatment variation implicitly contains average performance information. So, we can only generate a three-treatment experiment, reflecting the possible combinations of the two dimensions of treatment variations.

The three treatments were conducted using Ztree (Fischbacher, 2007). At the end, we conducted a computerized survey of demographic questions (e.g., age, gender, major of study, what considerations entered in the selection of the additional four members of their group, etc.).

First Phase: The Solo Gill-Prowse Real- Effort Task

In the first phase, each of the 120 participants completed an identical Gill-Prowse style 48 slider-bar real-effort task (Gill and Prowse 2012), which lasted 120 seconds. As shown in Figure 1, each slider

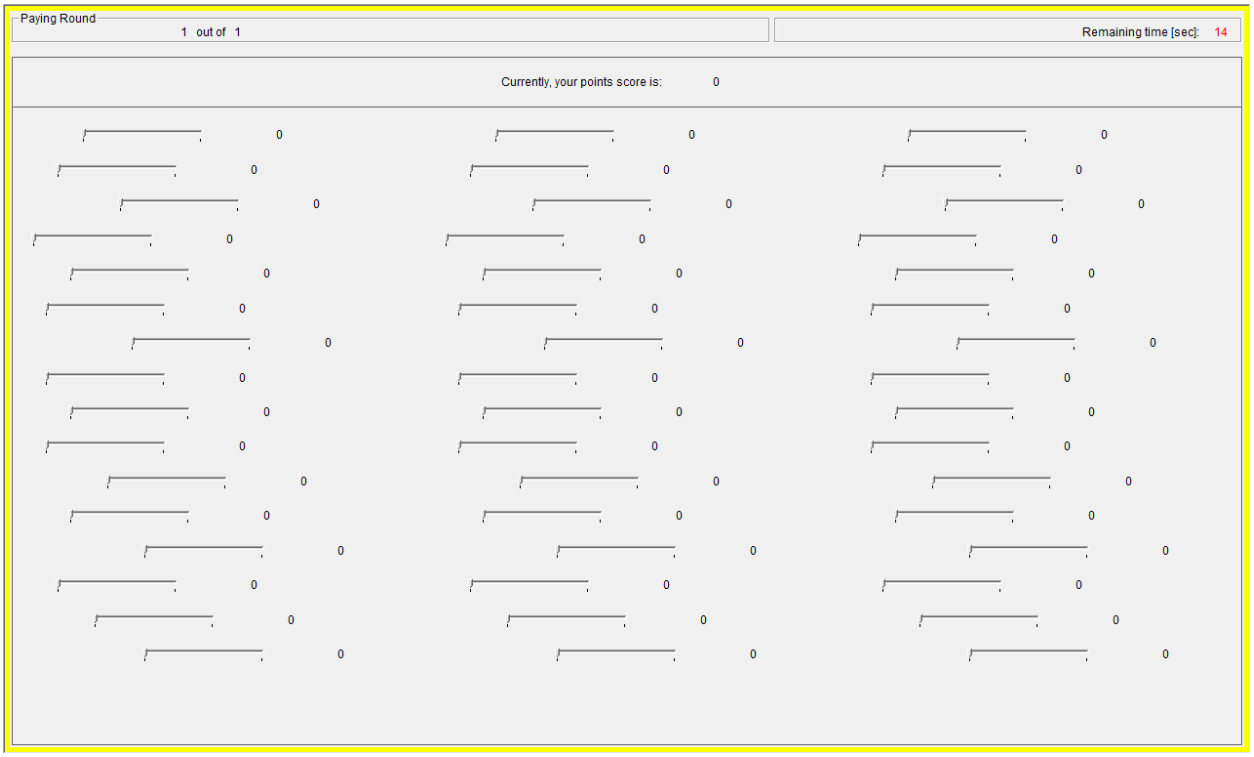

Figure 1: The Gill-Prowse Slider-Bar Real-Effort Task

was initially positioned at 0 and can be moved as far as 100. Each participant could use the mouse to click on and move each slider. Each slider had a number to its right showing its current position. The participant could readjust the position of each slider as many times as one wished. One's "points score" fully depended on the number of sliders positioned at exactly 50, i.e., in the middle, at the end of the 120 seconds. Prior to starting the first phase task, participants completed a quiz and a 30-second unpaid practice round to experience how the slider task worked.[8]

At end of the first phase the computer informed each participant how many sliders they positioned correctly at 50, how much money one has earned for the first phase (if chosen for payment), and one's "rank". The rank ranged from 1 to 6 and indicated one's earnings from the slider task. Ranks were as follows:

Rank #6 (0 to 9 sliders positioned correctly): $3

Rank #5 (10-19 sliders positioned correctly): $6

[8] Araujo *et al.* (2016), argue that the slider task is ill-conceived if one wants to see if higher money payments lead to better performance as there is little room to improve performance. But this critique is not relevant to our usage of the slider-task method since we are hypotheses are outside of any performance changes across our treatments.

Rank #4 (20-29 sliders positioned correctly): $9

Rank #3 (30-39 sliders positioned correctly): $12

Rank #2 (40-47 sliders positioned correctly): $15

Rank #1 (48 sliders positioned correctly): $20

Second Phase: The Gill-Prowse Real- Effort Task in a Group

At the start of phase 2, the instructions explained that the 20 participants would be organized into 4 groups, whose 5 members would remain anonymous to each other. The instructions explained that the software would, if possible, organize the groups exactly according to the preferences of each participant. Prior to submitting these preferences, participants were told that in the second phase all participants would complete the 120-second 48 slider-bar task again and were told what information the computer would and would not inform them of after the task was completed (corresponding to the treatments discussed in Table 1 above).[9] After completing a quiz to verify understanding, each participant was asked to choose the ranking level (shown with the monetary earning associated with it) of each of the four members they would prefer to be in their own group. Although organized into groups, each participant played the slider-effort task individually and under the same conditions of the first phase.

If the second phase was selected for pay, and the participant was in the absolute pay treatment, then earnings are determined by the rank that he or she had attained in the second phase. If the participant was in the relative pay treatment, the top performer relative to the other four participants in the group received $15, the second best performer received $12, then $9, $6, and $3 for the third, fourth, and worst performers respectively.

The participants are never told exactly how the software performs group matching nor how close it was in successfully meeting their preferences. The computer truthfully was programed to match participants as closely as possible to their stated preferences.[10] In order to gauge participants

[9] They are also informed that one of the four groups will be randomly chosen to receive a coffee mug, which was done to instill a salient "group" even in the absolute pay treatment, but also designed to not be tied to group performance.

[10] The computer would select one participant to start the first group and match them with each of their preferred ranks from the other participants in the session if there were any. After the first group was populated the computer would choose a second participant from the remaining participants not yet in a group and start the process over considering participants not yet in a group until all participants had been placed in a group.

beliefs on their group make up, prior to the second slider task (but after they provided their preferences), we asked them to report how many sliders they thought the members of their group had managed to position correctly on average in the first phase (not including themselves). If correct, they were told they would be paid an additional $2 in the experiment. After the second phase is over, participants were asked if they think the members of their group positioned more or fewer sliders correctly on average compared to the first phase. If correct, they were told they would receive $1. As reported towards the end, the question of beliefs did not distort the revelation of one's preferences of comparison group.

5. Analysis and Results

We conducted six 20-participant sessions at experimental economic lab at George Mason University.[11] Forty participants (two sessions) participated in each of the three treatments. Participants sat at visually isolated computer terminals and completed the task via a z-Tree (Fishbacher 2007) software program.

Across treatments participants positioned an average of 14.8 sliders correctly in the first phase and 18.3 sliders correctly in the second phase, an average improvement of 3.55 (two-tailed sign test, $p<0.01$). Second phase improvement is not significantly different by whether pay is absolute or relative (two-tailed Mann-Whitney, $p=0.15$) or by whether participants will learn information on relative performance ($p=0.374$). On average, subjects earned $7.78 in the task in addition to receiving a $5 show-up fee for participating.

The central research question, experimental goal #1, can be broken into two parts:

1. Does the aspirational income effect exist—i.e., play a role in the formation of a comparison group?
2. If the aspirational income effect does exist, is it potent enough to offset the relative income effect?

To answer the questions, we designed the experiment so that one's earnings in the second phase, in the two absolute performance treatments, is independent of the average performance of the chosen group. So, one's group choice in these two treatments could not be systematically explained

[11] We received approval from the institutional review board of our respective universities.

in terms of the pecuniary incentive.

One's choice in Treatment 1, where subjects learn no information about their groupmates and can thus not compare themselves to either higher or lower performers, represents the "random" group selection baseline. One's choice in Treatment 2, which provides such information, allows them to compare their own pay and performance. As in Treatment 1, Treatment 2 also removes any pecuniary incentive for group choice. The choice of groupmates in case of absolute pay, can only be the outcome of the aspiration-based effect and/or the relative-income-based effect arising from identification with the comparison group.

> Result 1: The majority of people choose to be paired with a group who on average performed as well or better than they did themselves when in an absolute payment treatment; both with (97.5%) and without (77.5%) performance information.

Result 1 provides initial evidence for experimental goal #1. The standard relative income effect theoretical prediction would be that one would prefer one's groupmates to be on average weaker performing (fewer slider bars completed) than one's own performance. The proposed aspirational income hypothesis, while not denying such prediction, predicts in addition that one should prefer one's groupmates to be on average stronger performing than one's own performance.

Table 2 shows whether individuals in each absolute pay treatment prefer individuals who complete fewer slider bars correctly than themselves or whether they prefer people who perform as well or better than themselves. The "random" choice behaviour baseline from choices in Treatment 1, where they cannot see how well other group members ultimately perform, shows that only 22.5% of individuals choose a group that performs worse they did themselves.

	Relative Income Hypothesis (RIH) —Prediction	**Aspirational income Hypothesis (AIH) —Prediction**	**Results:**	**Conclusion:**
Treatment 1: Absolute Pay w/o Info	Participants should choose weakly lower performing group	Participants should choose weakly higher performing group	22.5% choose lower performing group	Supports AIH
Treatment 2: Absolute Pay w/ Info	Participants should choose definitely lower performing group	Participants should choose definitely higher performing group	2.5% choose lower performing group	Supports AIH
Treatment 3: Relative Pay w/ Info	Participants should choose strongly lower performing group	Uncertain. Participants face mixed incentives.	35% choose lower performing group	Neutral: neither contradicts RIH nor AIH

Table 2: Hypotheses, Predictions, and Results Summary

In Treatment 2, when relative performance information is provided and allows for interpersonal comparison, only 2.5% of participants choose to be grouped with participants who performed less well than they did themselves, a highly significant decrease (two-tailed Mann-Whitney, $p<0.01$). Very few participants chose groups that on average did as well as they did themselves.[12]

Result 2: When people know they will be given relative performance information, significantly fewer people choose to be paired with a group who on average earned less and performed worse than they did themselves compared to when they will not be provided with relative performance information.

[12] In Treatment 1 and Treatment 2, only 4 out of 80 (5%) participants chose a group whose average is equal to theirs.

The significant shift towards choosing group members who perform as well as or better than oneself supports the existence of the aspirational income effect. Further, the result supports the notion that on average, when pecuniary incentives are not at stake, the aspiration-based effect overwhelms the relative-based effect. Put differently, once information about the performance group is possible, we do not see a shift towards choosing worse performing group-mates (relative income effect prediction) but exactly the opposite (aspirational income effect prediction).[13]

Next, comparing Treatment 2 to Treatment 3, pay becomes relative to how one performs in comparison to the performance of one's comparison group. Note, the word "relative" here is about substantive utility, and should not be confused with the word "relative" in the expression "relative income hypothesis." In the RIH, the word "relative" denotes the symbolic utility one derives from joining or identifying with a comparison group, which would be positive symbolic utility if the group is of lower rank. In Treatment 3, one's substantive utility would also be positive if one joins a group of lower performance. But, again, the word relative has double meanings that are as far apart as the difference between symbolic utility and substantive utility highlighted at the outset.

In Treatment 3 the relative pay aspect of the treatment creates a strong competition between participants which, irrespective of one's preferences in the realm of the relative income effect and the aspirational income effect, would predict that due to real pecuniary costs would invoke a person to choose worse performing groupmates more often all else equal. We see that, while only 2.5% of individuals prefer a worse performing group under absolute pay when provided information about one's group mates, 35% prefer a worse performing group under relative pay ($p<0.01$, comparing Treatment 2 and Treatment 3). Still, note, 65% of participants did not choose worse performing groups, which is unexplained by the RIH. Out of the said 65%, only 5% (2 out of 40 participants) chose groups that on average performed equal to their own performance—i.e., 60% chose groups that on average performed better than their own performance.

> Result 3: Significantly more people prefer to be matched with worse performing groupmates when paid under a relative performance pay system than when paid under

[13] While most participants chose groups that are equal or higher than their own performance, there is no trend that people with a lower rank wanted to jump much higher than people at middle rank. There is no significant trend of average group rank preferred changing systematically by one's own rank in the absolute pay with information treatment and the absolute pay without information treatment (Trend test, $p>0.3$ in each case). As for the relative pay treatment, the trend is significant ($p=0.03$), as the pecuniary motive for choosing worse performing group mates appears, as we discuss more in this section.

an absolute pay system.

Result 3 provides initial evidence of for our second experimental goal. First, Result 3 neither contradicts RIH nor AIH. Recall, RIH and AIH are about symbolic utility as one compares one's income to the income of a comparison group. Symbolic utility captured in Treatments 1 and 2 differ from pecuniary gain captured by Treatment 3. Treatment 3, unlike Treatments 1 and 2, captures the consequence of higher cost on the demand for the symbolic effect—whatever is the net direction of such effect. Result 2 shows that on average people are rationally demanding fewer higher-rank comparison groups, when it becomes costly, i.e., they are responsive to pecuniary cost of pursuing whatever is predicted by RIH and AIH.

Secondly, note that a weak majority of individuals still prefer groupmates that are on average better performing or equally performing compared to themselves, even if it comes at the potential sacrifice of own earnings (two-tailed test, 65% > 50%, p=0.057). This suggests that the aspirational income effect is a strong enough motivation for many individuals to overlook the pecuniary costs of choosing an aspirational group.

For a robustness test, in Table 3, we pooled data across the three treatments to explore how

Table 3: Robustness Tests of Groupmate Choices

	(i-Logit) Prefer Worse Performing Groupmates on Average	(ii-OLS) Difference Between Own Rank and Average Groupmates' Rank
Absolute Pay w/o Info (Treatment 1)	**-0.618**	**0.544**
Absolute Pay w/ Info (Treatment 2)	**-3.045*** **	**1.281*** **
Constant	**-0.619***	**1.119*** **
Obs	**120**	**120**

Note: *, **, and *** reflect $p < 0.1$, $p<0.05$, and $p<0.01$ respectively. In model (ii-OLS), to recall, the person who performs highest is given the lowest (best) rank #1, the slower performer is given rank #2, and so on. Therefore, difference (Ownrank - Avg Groupmates' Rank) is positive if one preferred better performing groupmates and negative if one preferred worse performing groupmates.

payment type and information content affects group choices on two margins. First, in the column (i) logit model, we provide additional evidence of the AIH by replicating Result 2. We see that in comparison to the suppressed relative pay treatment with information (Treatment 3), participants under absolute pay with information (Treatment 1) are less likely to choose a worse performing group on average ($p=0.004$). Likewise, a Chi-Squared test comparing the Treatment 2 to Treatment 1 coefficients ($p=0.025$) shows that agents are likely to reduce their propensity to choose worse performing group members even when provided relative performance information only, i.e., in the absence of pecuniary incentives.

Second, in the column (ii) OLS model we see that in comparison to the suppressed relative

pay treatment with information (Treatment 3), participants under absolute pay with information (Treatment 2) aspire to join much better performing partners than themselves (p=0.006). Similarly, a Chi-Squared test comparing the Treatment 2 to Treatment 1 coefficients (p=0.051) echoes the previous result that relative performance information leads agents to choose higher performing group members.

Applying our results to the predictions of both hypotheses in Table 2, we can draw several conclusions. The relative income hypothesis (RIH) predicts that agents should (weakly) choose a comparison group of lower status than their own, and more so in the case when (Treatment 2) they will be definitely cognizant of the average performance of the group. In contrast, the aspirational income hypothesis (AIH) predicts that agents should (weakly) choose a comparison group of higher status than their own, and more so in the case when (Treatment 2) they will be definitely cognizant of the average performance of the group.

The experimental findings support both the AIH and RIH. In particular, we observed, 22.5% of the participants chose a group of lower status than their own which dropped to only 2.5% once they are told they can know the average performance of the chosen group. Further, experimental findings show that the aspirational income effect outweighs the relative income effect in our data.

6. Beliefs and Stated Preferences

We elicited the saliently rewarded beliefs of the participants concerning the average number of sliders that one thinks his or her group had completed in the first phase. A possible concern could be that people would not reveal their true preferences when choosing a group if they believe that there is excess demand for their desired rank. They may perhaps strategize by expressing preferences that are lower than their true preferences.[14] The collected data does not justify the concern

The stated preferences of rank are higher than their belief in what actual group rank they

[14] We checked the difference between the "belief concerning other group members performance in the first phase" and "one's performance in the first phase," and we sorted that by the first phase rank. Whether the difference is pooled or separated by treatment, we see that better performing individuals are more likely to believe their own assigned group is worse than their own performance, and worse performing individuals think their group will perform better than they did (Trend test in each treatment, p<0.01).

would become members. Participants on average preferred people who had a high performance; 27.9 completed sliders, if we take the low end of each range in average calculation, and 34.0 completed sliders, if we take the high end of each range in average calculation. But people believed that their groupmates had an average of 18.1 completed sliders (paired t-test, $p<0.001$ each). That is, the low belief did not stop them from expressing high preferences.

The realized actual group average completed sliders was 14.8, which is significantly below the belief of 18.1 (paired t-test, $p<0.01$). This suggests that people over-estimated how well their groupmates did on average. Interestingly, we find in a similar statistic that participants think that the group average is higher than their own performance (paired t-test $p < 0.01$).

The same finding holds if we regroup the data according to treatments. In the absolute pay with information treatment, people think their assigned group completed 6.25 more sliders on average than they did themselves. Relative Pay (with information) people think their assigned group completed only 1.175 more sliders on average than they did themselves (two-tailed Mann-Whitney, $p = 0.053$). This supports our other result: participants believed that they are being assigned to a relatively higher performing group. Given this belief, more participants demanded to be grouped with the higher performing groups once they were told that they will be informed of their relative performance in such groups.

7. Conclusion

This paper provides a conceptual framework that hypothesizes a positive effect that may arise from joining a comparison group whose income/status is higher than one's own. This hypothesized positive effect works against another negative effect that may arise from joining the same group. People derive pleasure—along with the recognized pain—from associating themselves with a group or an individual that ranks higher than their own rank. We call this positive effect here the "aspirational income effect." This paper connects it to the long recognized relative income effect in the economics literature, the variable that gives rise to the much discussed negative effect.

Our data provides the first experimental economics data that directly tests and confirms the proposed aspirational income hypothesis. Given the success past research has found in exploring the relative income effect and its relationship to happiness in different populations and cultures,

researchers may likewise find further testing of the aspirational income effect profitable.

Our data show that people like to be part of high achieving groups, even when they are not able to achieve at that same level of success or income. Explanations for this "feather in one's cap" type of desire include pride, belief in positive externalities, the preference to be part of winning teams, Veblen's conspicuous consumption, and so on. All of these explanations suggest limits on the relative income hypothesis. Our experimental data shows that the aspirational income effect not only exists but, in situations like the one we study, can provide gains that exceed the pain (predicted by the relative income hypothesis) that is associated with belonging to groups whose status higher than one's own.

Our study highlights several implications of the aspirational income hypothesis. First, the issue of aspiration is central to happiness studies, especially with respect to the Easterlin Paradox as noted above (Easterlin et al., 2010; Layard et al., 2010). A full undertaking to solve the happiness puzzle must reckon with the two dialectical effects: relative income and aspirational income.

Second, the aspirational income effect may explain the economic role of heroes and role-models, from sports celebrity adulation to movie stars to the frequently observed awe displayed towards authority (Khalil, 2005). The aspirational income hypothesis might provide a conceptual tools/framework to improve the ability of economists to explore these topics.

Third, the aspirational income effect may explain the puzzle of what James Heckman (Heckman et al., 2014) calls "non-cognitive skills" or "character." According to Heckman and collaborators, a great determinant of earning is whether the person is intrinsically motivated, ready to assume responsibility and work hard, even when expected returns seem low. Such motivation is directly related to entrepreneurship, a phenomenon that can greatly benefit from the proposed aspirational income effect (Khalil 1997).

There are many other implications, ranging from labor economics to development economics, that can benefit from insights afforded by the aspirational income hypothesis. Future research can illuminate the practical consequences of the aspirational income effect. Does the joining of higher performing groups induce participants to exert more effort, even if we hold pecuniary pay constant? This paper aspires to provide the introductory step to justify the posing of such a question.

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Appendix

Instructions appearing on subject screens

Thank you for participating in today's experiment. You've earned a $5 show-up bonus for participating. In reading and following the instructions below, you have the potential to earn significantly more. Please read these instructions carefully!

This experiment includes two phases. At end of the experiment, one of them will be randomly selected to determine your payoff. Each phase has a 50% chance of being chosen as the payoff round. So, it is in your best interest to treat each round as if it is the one that determines your payoff.

Instructions for Phase I

How You Earn Money

Each of the 20 people in the experiment will undertake an identical task lasting 120 seconds. The task will consist of a screen with 48 sliders. Each slider is initially positioned at 0 and can be moved as far as 100. Each slider has a number to its right showing its current position. You can use the mouse in any way you like to move each slider. You can readjust the position of each slider as many times as you wish. Your "points score" in the task will be the number of sliders positioned at exactly 50 at the end of the 120 seconds.

Depending upon how many sliders you position correctly you will be placed into one of 6 ranks. Each rank corresponds to a certain level of payment—above the $5

show-up bonus. Rankings and their corresponding payments are as follows:

Rank #6 (0 to 9 sliders correct): $3

Rank #5 (10-19 sliders correct): $6

Rank #4 (20-29 sliders correct): $9

Rank #3 (30-39 sliders correct): $12

Rank #2 (40-47 sliders correct): $15

Rank #1 (48 sliders correct): $20

After the 120 seconds has expired, the computer will inform you of your rank, how many sliders you positioned correctly, and how much you will be paid if phase I is selected. You will receive your payment in cash at the end of the experiment.

Prior to beginning the task you will have an opportunity to practice positioning the sliders.

Please answer the following questions about the experimental procedure

1) If you position 25 sliders correctly how much will you be paid in total (not including your show-up bonus?)
   a) $6 b) $9 c) $12 d) $15

2) If you position 15 sliders correctly how much will you be paid in total (not including your show-up bonus?)
   b) $6 b) $9 c) $12 d) $15

3) If you position 35 sliders correctly how much will you be paid in total (not including your show-up bonus?)
   c) $6 b) $9 c) $12 d) $15

The following screen will allow you to practice position sliders for 30 seconds.

<practice task>

Your task will start shortly.

<actual task>

Your points score was: XXX

Your Rank Is	XXX
You Made	XXX
Number of Slides You Positioned Correctly	XXX

Instructions for Phase II

This is the last phase of the experiment.

In this phase the 20 people participating will be anonymously divided into 4 groups of 5 people. You will have a say which people to add to your group. The first computer screen will ask you to select the other 4 people who will be in your group.

As indicated on the screen, select the ranking level you prefer for each member of your group. If possible the computer will form a group that exactly fits the ranking preferences it is given.

Each of the 20 people in the experiment will be asked to complete a new task of positioning 48 sliders. The new set is very similar to those in the first phase of the experiment. You will have 120 seconds to complete the task.

After you have completed the task:

The computer will inform you:

- **How many sliders you positioned correctly**
- **The average number of sliders the other people in your group positioned correctly**

<Or based upon treatment>

The computer will not inform you:

- **The average number of sliders the other people in your group positioned correctly**

How You Earn Money

<In the absolute pay treatments the following texts will be used>

In this phase, you will be paid based upon your rank in this phase. Depending upon how many sliders you position correctly you will be placed into one of 6 ranks. Each rank corresponds to a certain level of payment—above the $5 show-up bonus. Rankings and their corresponding payments are as follows:

Rank #6 (0 to 9 sliders positioned correctly): $3

Rank #5 (10-19 sliders positioned correctly): $6

Rank #4 (20-29 sliders positioned correctly): $9

Rank #3 (30-39 sliders positioned correctly): $12

Rank #2 (40-47 sliders positioned correctly): $15

Rank #1 (48 sliders positioned correctly): $20

<In relative pay treatment the following text will be used instead>

In this phase, you will be paid based upon your rank in this phase. Depending upon how many sliders you position correctly relatively to how many sliders the other

people in your group position correctly. Each rank corresponds to a certain level of payment—above the $5 show-up bonus. Rankings and their corresponding payments are as follows:

Rank #5 (Fewest sliders correct in group): $3

Rank #4 (Second fewest sliders correct in group): $6

Rank #3 (Third most/Third fewest correct in group): $9

Rank #2 (Second most sliders correct in group): $12

Rank #1 (Most sliders correct in group): $15

Phase II Quiz:

Please answer the following questions about the experimental procedure

<for absolute pay treatments>

1) If you position 15 sliders correctly how much will you be paid in total (not including your show-up bonus?)

a) $6 b) $9 c) $12 d) $15

2) If you position 35 sliders correctly how much will you be paid in total (not including your show-up bonus?)

a) $6 b) $9 c) $12 d) $15

<for relative pay treatment>

1) If you position 15 slider bars correctly, and other people in your group respectively

position 10, 19, 25, 37 correctly, how much will you be paid in total (not including your show-up bonus?)

a) $6 b) $9 c) $12 d) $15

2) If you position 35 sliders correctly, and other people in your group respectively

position 10, 19, 25, 37 correctly, how much will you be paid in total (not including your show-up bonus?)

a) $6 b) $9 c) $12 d) $15

3) You will be informed how many sliders you position correctly in the second stage.

a) True

b) False

4) You will be informed how many sliders the members of your group position correctly in the second stage.

a) True

b) False

Please select the levels that you would prefer the other 4 people who will be in your group to have. You can select any combination of same and different levels.

What rank would you like the first member of your group to have? (1 earned $3 - 6 earned $20)
What rank would you like the second member of your group to have? (1 earned $3 - 6 earned $20)
What rank would you like the third member of your group to have? (1 earned $3 - 6 earned $20)
What rank would you like the fourth member of your group to have? (1 earned $3 - 6 earned $20)

<Waiting screen/screens>

You now have an opportunity to earn an additional $2. How many sliders do you think the members of your group (i.e., the actual group that the software managed to put together, given your wishes) positioned correctly in the first stage, on average (not including you)? If you are correct you will be paid an additional $2.

Your task will start shortly

<second task>

You now have an opportunity to earn an additional $1. Do you think the other members of your group (not including you) positioned more or fewer sliders correctly in the second stage compared to the first stage, on average? If you are

correct you will be paid an additional $1.

Your points score in the second stage was: XXX

Number of slides you positioned correctly in the second stage: XXX

The number of slides positioned by the members of your group, on average, in the first stage: XXX

From your guess about the first stage performance of your group members you earned an extra ($3 or $0)

The number of slides positioned by the members of your group, on average, in the second stage: XXX

From your guess about the second stage performance of your group members you earned an extra ($1 or $0)