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Social comparisons in job search: experimental evidence*

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Abstract

Using a laboratory experiment we examine how social comparisons affect behavior in a sequential search task. In a control treatment, subjects search in isolation while in two other treatments subjects get feedback on the search decisions and outcomes of a partner subject. The average level and rate of decline in reservation wages are similar across treatments. Nevertheless, subjects who are able to make social comparisons search differently from those who search in isolation. Within a search task we observe a reference wage effect: when a partner exits, the subject chooses a new reservation wage which is increasing in partner income. We also observe a social learning effect: between search tasks, subjects who have been paired with a more patient and successful partner increase their reservation wages in the next task.

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1 Introduction

Job search is typically not undertaken in isolation. Instead, job-seekers are aware of the job search activity of friends, colleagues and acquaintances, and information about others' job search successes and failures is often available. The social nature of search introduces scope for several factors that are usually ignored in economists' models of job search. In particular, a considerable body of evidence from social psychology shows that social comparisons have a powerful influence on the way humans feel and behave (Festinger 1954). People care about their status and evaluate this by comparing themselves with others, and people who are uncertain about what decision to make are influenced by the observed behavior of others (Bandura & Walters 1977). There is indirect evidence that such social comparisons affect job search. Using survey data, Clark (2003) finds that the unemployment rate in the social reference group is strongly positively correlated with the self-reported well-being of the unemployed. Thus, apparently, the unemployed feel better when they see that others around them are also unemployed. If this reduces the motivation to exit unemployment in areas with high unemployment it may contribute to regional variation in unemployment rates. More generally, social comparison effects may contribute to findings that search outcomes are correlated within groups of individuals who interact (e.g. Marmaros & Sacerdote 2002).

However, it is difficult to attribute correlated outcomes in field data to social comparison effects because there are other ways that interaction within a group can affect search outcomes. As noted in several theoretical and empirical studies of labor markets, social interaction can also affect job search by influencing a job-seeker's available options and information about those options. For instance, graduates from the same institution may share job news and make use of alumni contacts which help them find a job. These types of *network effects*, which work through changes to the offer process (or information about the offer process) and which therefore have direct effects on the expected costs and benefits of taking an offer or waiting, can be viewed through the lens of standard economic theory in which job-seekers weigh up the expected costs and benefits of search.[1]

In this paper we focus on the case where one job-seeker's offer process is independent of another's. In this case, observing another job-seeker's decisions or outcomes may still influence behavior due to *social comparison effects*. To isolate social comparison effects from network effects we use laboratory methods, where interaction within a group can be tightly controlled.

Social comparison effects on job search can arise for a variety of reasons. One reason is that job-seekers may have *distributional preferences*, i.e. they care about both their own income and their income relative to others. There is extensive evidence that interpersonal comparisons can influence individuals' sense of well-being (Frank 1985, Loewenstein, Thompson & Bazerman 1989). Indeed, a large literature has emerged studying the impact of relative wage concerns on labor market outcomes (Akerlof & Yellen 1990, Frank 1984). As a consequence, economists have developed formal models incorporating distributional concerns into individual preferences (e.g. Fehr & Schmidt 1999, Bolton & Ockenfels 2000). Applying such a model to a job-search context, job-seekers with distributional preferences evaluate the attractiveness of a wage offer by comparing it with the wages other job-seekers have accepted, and so the offers others have accepted will influence their own decision. A second reason that social comparisons may affect job search stems from *learning*. There is a large literature empirically supporting the idea that people learn from each other in complex environments (see Manski 2000). Even if offer processes are independent, and even if job-seekers care only about their own narrowly-defined self-interest, in an environment where weighing up the attractiveness of a wage offer requires comparing it with a dynamic lottery, a job-seeker may be uncertain about whether it is

[1] The use of a network in job search has been theoretically analyzed by Galenianos (2013), Galenianos (2014), Horváth (2014) and Dustmann, Glitz & Schönberg (2016). Empirical evidence of networking benefits in job search is supplied by a number of studies: Cingano & Rosolia (2012) stress the importance of networks of former co-workers; Cappellari & Tatsiramos (2015) consider networks of friends; Marmaros & Sacerdote (2002) consider networks of room-mates in College.

worth accepting the wage offer. Whether others have accepted or rejected similar offers may then influence their decision. In particular, if others accept a similar offer this may reinforce a view that the offer is worth accepting and lead the job-seeker to accept it.

While field data offers ample evidence that social context matters, it does not typically allow separate identification of network versus social comparison effects. For example, Marmaros & Sacerdote (2002) examine the link between social interaction and job search among Dartmouth college graduates. They find that employment outcomes for a student are correlated with mean outcomes for that student's freshmen hallmates and dormmates. Because hallmates and dormmates are randomly assigned, these correlations cannot be attributed to selection effects. These correlations may be due to some sort of "peer effect" whereby one individual's behavior influences another's, but (as noted by Marmaros and Sacerdote) they may also arise because of shocks which are correlated within groups. Moreover, even if the correlations reflect peer effects there is insufficient information to know whether these are driven by network or social comparison effects. The difficulties of disentangling network and social comparison effects using naturally occurring data motivated us to use an experimental approach.

Our framework for examining whether social comparisons affect job search is a sequential search decision experiment. This is based on McCall's (1970) "Basic Search Paradigm" in which searchers receive a wage-offer from a distribution and decide whether to accept it, receiving this wage in each remaining period, or reject it and wait for another offer. We vary across treatments whether subjects make decisions in isolation or whether they can observe information from a partner's wage offers, decisions, and earnings. A long-established experimental literature has studied the sequential search task and its variants. Early studies compared individual behavior with optimal search rules and alternative heuristics (Schotter & Braunstein 1981, Braunstein & Schotter 1982, Hey 1982, Hey 1987, Oaxaca & Cox 1989, Oaxaca & Cox 1992) and more recent work has focused on behavioral explanations for deviations from theoretical predictions (Kogut 1990, Sonnemans 1998, Schunk 2009, Schunk & Winter 2009, Brown, Flinn & Schotter 2011). A feature of all of this literature is that the search decisions are made in isolation. We extend this literature by adding a social context to the search task.

Our research question is whether social comparisons have an impact on job search, and so our experiment eliminates the possibility of network effects by design. Within the lab, we are able to tightly control the offer process, the interaction between subjects, and the information available to subjects. This allows us to exclude social network effects — subjects have no way of influencing another's offer process — and also to exclude common shocks to the offer process. To test for social comparison effects we vary across treatments the feedback given to subjects about the search decisions and outcomes of others. In a control Isolated treatment subjects conduct the search task in isolation. They receive no information about others' search decisions or outcomes. In two other treatments, subjects are randomly and anonymously paired and receive feedback on their partner's search decisions and outcomes as they conduct the search task. In the Partner treatment subjects observe their partner's income, whereas in the Partner-Offer treatment, they are also informed of the offers rejected by their partner. In all treatments the subjects are given full information about the stochastic offer process, and the earnings of a subject depend only on how they react to their own offers, and are independent of the decisions and earnings of other subjects. Thus, for a fully rational self-interested subject, feedback about a partner's search decisions and outcomes is irrelevant.

In our Isolated treatment, in line with the long-established literature, average reservation wages are lower than the expected earnings-maximizing benchmark, and reservation wages decline within the search task. In the Partner and Partner-Offer treatments we observe similar average levels and rates of decline of reservation wages, but we also observe that subjects systematically respond to feedback about their partners' search outcomes.

In the Partner and Partner-Offer treatments, when a subject observes their partner accepting a low wage they reduce their reservation wage more than they otherwise would, while if they observe their partner accepting a high wage they reduce their reservation wage less than they otherwise would. These results are qualitatively consistent with predictions of a model in which job-seekers care about earnings differentials as well as their own earnings. The Partner-Offer treatment also allows us to see whether the offers rejected by the partner affect reservation wages. These offers do not directly affect partner income, but do afford information about the partner's reservation wage. In fact, rejected partner offers do not influence the reservation wage, which suggests the within-task social comparison effects are not due to naive imitation in which job-seekers simply attempt to copy their partner's reservation wage. We do however see evidence of learning across search tasks. In all treatments initial reservation wages increase with experience. However the increase is significantly greater in the treatments that allow social comparisons. We find that, in the social comparison treatments, subjects who are paired with a more successful and more patient partner in the previous task tend to increase their initial reservation wage in the next task.

The remainder of the paper is organized as follows. In Section 2 we review the (separate) relevant literatures on search experiments and social comparisons. In Section 3 we describe our experimental design and procedure, and in Section 4 we present our results. Section 5 offers a discussion and some concluding comments.

2 Literature

2.1 Search Experiments

The sequential search model (McCall 1970) provides a tractable framework to analyze search decisions. The model assumes that a job-seeker receives one wage offer per period of search, where offers are independently drawn from a stationary and non-degenerate distribution, with a fixed outside option (typically a per-period unemployment benefit minus search cost). If the job-seeker accepts an offer they exit search and receive this wage for all future periods. If they reject the offer they wait for another offer in the next period. It is assumed that the time horizon is infinite and the job-seeker maximizes expected discounted utility. The optimal decision is to accept any offer above or equal to a critical value (the reservation wage), which is constant over periods, and to continue with search otherwise.

Early experimental studies by Schotter & Braunstein (1981, 1982) and Hey (1987), examine how subjects search in a lab environment based on this basic search paradigm. Other studies have investigated variants of the model, such as using a fixed time horizon (Oaxaca & Cox 1989, Oaxaca & Cox 1992), imperfect information about the offer distribution (Hey 1981, Hey 1982, Moon & Martin 1990, Moon & Martin 1992, Moon & Martin 1996, Cox & Oaxaca 2000), heterogeneous search ability (Falk, Huffman & Sunde 2009*b*, Falk, Huffman & Sunde 2009*a*) and variable search costs (Harrison & Morgan 1990, McGee & McGee 2016).

Previous experiments consistently show that subjects tend to (i) search too little and accept lower offers compared to the risk-neutral prediction, and (ii) reduce their reservation wages over the course of a sequential search task. Some behavioral theories have been proposed as explanations for these findings and have been tested in the laboratory. Studies suggest that the sunk-cost fallacy (Kogut 1990, Sonnemans 1998, Sonnemans 2000), loss and risk aversion preferences combined with bounded rationality (Schunk 2009, Schunk & Winter 2009, Soetevent & Bruzikas 2016) and subjective costs of uncertain waiting time (Brown et al. 2011) all contribute to these regular departures from the theoretical predictions.

Some experiments repeat the search task, allowing investigation of how behavior changes with experience, yet findings about learning effects are limited. Kogut (1990) is the first experiment which repeats the search task within subject to allow for experience effects. With a small sample of subjects who conduct a series of repeated search tasks, he identifies a significant learning effect (i.e. search duration increases when subjects become more experienced) for half of the subjects. Sonnemans (1998) offers a more systematic examination of learning, showing that among subjects who repeat the search task many times, experimentation with different search strategies decreases with experience and search efficiency increases with experience. Note that with fewer repetitions within the same search environment (five compared to over 10 times in the two other studies), Brown et al. (2011) find no significant learning effects.

All of these studies focus on individual decision-making, and exclude any social interaction. As far as we are aware the only experimental study embedding the basic search task in a social context is Ibanez, Czermak & Sutter (2009), although their focus is rather different from ours. They examine whether search outcomes are improved if decisions are made by a group instead of an individual, finding that decisions made by groups are indistinguishable from individual decisions. Our focus instead is on whether an individual's search decision is influenced by social comparisons.

2.2 Social Comparison Effects

We define social comparison effects to be the causal effect on an individual's decision from observing other individuals' independent decisions and outcomes. In the context of job search, independence means that the job-seeker's offer process and earnings are not directly affected by other job-seekers' decisions and outcomes. We are particularly interested in two mechanisms for social comparisons which are relevant in the context of job search: distributional preferences and learning.

Social comparison effects have been found by previous field and experimental studies in various different contexts, such as labor effort provision (Abeler, Altmann, Kube & Wibral 2010, Angelova, Güth & Kocher 2012, Charness & Kuhn 2007, Clark, Masclet & Villeval 2010, Cohn, Fehr, Herrmann & Schneider 2014, Gächter, Nosenzo & Sefton 2012), job satisfaction (Card, Mas, Moretti & Saez 2012, Clark & Oswald 1996), ultimatum bargaining (Bohnet & Zeckhauser 2004, Knez & Camerer 1995) and choice under risk (Friedl, De Miranda & Schmidt 2014, Gamba, Manzoni & Stanca 2017, Haisley, Mostafa & Loewenstein 2008, Lahno & Serra-Garcia 2014, Linde & Sonnemans 2012, Linde & Sonnemans 2015, Rohde & Rohde 2011).

Distributional preferences modeled by Fehr & Schmidt (1999) and Bolton & Ockenfels (2000) have been frequently proposed as an explanation for social comparison effects. Some of those experimental studies have further explored whether standard models of social preferences can be extended to decision problems with uncertain outcomes. There is mixed evidence on the force of distributional preferences when choices do not directly affect the earnings of others. Rohde & Rohde (2011), Linde & Sonnemans (2012) and Lahno & Serra-Garcia (2014) find that individual choices are sensitive to the earnings of other subjects even when subjects have no direct effect on each others' earnings. Linde & Sonnemans (2015), however, find no difference between decisions made in isolation and those made in a social setting. As we show later, specific reference wage effects follow from the application of Fehr-Schmidt preferences to our laboratory setting.

Another potential source of social comparison effect is social learning. Subjects may be uncertain about the quality of their decisions, and therefore "may seek to draw lessons from observation of the actions chosen and outcomes experienced by others" (Manski 2000).[2] A number of studies have documented how people learn in a social context by observing the decision of others. For instance, Offerman & Schotter (2009) show that when offered opportunities to sample the choices of others, subjects do choose to sample, and imitate the behavior which leads to higher realized profits. In a field experiment among financial brokers, Bursztyn, Ederer, Ferman & Yuchtman (2014) find that brokers are influenced by their peers, and "unsophisticated" brokers tend to be affected more by the "sophisticated" ones. This is consistent with social learning in other field experiment contexts (Cai, Chen & Fang 2009, Conley & Udry 2010, Cai, De Janvry & Sadoulet 2015).

Our paper is the first to investigate the relevance of distributional preferences and learning in a search task in which social comparisons are possible.

3 Experimental Design

3.1 The basic search task

We start by describing the search task which is common to all three treatments. To mimic the stationary infinite-horizon of the basic search paradigm, we use a random termination method whereby the search task terminates after each period with a constant probability.[3]

[2]The effects of getting additional search information about the market condition have been investigated the field experiments by Altmann, Armin, Jäger & Zimmermann (2015) and Belot, Kircher & Muller (2015). This is different from what we mean by social learning: the information in their settings comes from a centralized source (e.g. employment service) rather than from social interactions.

[3]Random termination has been used extensively to mimic infinite-horizon games. See, for example, Dal Bó & Fréchette (2017). The only other search experiment of which we are aware which uses random termination is Brown et al. (2011).

The continuation probability in the uncertain horizon model we use plays the same role as the discount factor in the infinite horizon model: a subject maximizing expected earnings should use the same (constant) reservation wage as an infinitely-lived risk-neutral agent with a discount factor equal to the continuation probability.

The search task consists of a sequence of periods. In the first period, subjects choose a reservation wage. This is an integer between 0 and 1000. Subjects then receive an offer, randomly drawn from a discrete uniform distribution over 1 to 1000. The offer is automatically accepted if it is greater than or equal to the reservation wage, and rejected otherwise.[4] If the offer is accepted, subjects receive that wage as (points) income in all subsequent periods, receive no further offers and make no further decisions for the remainder of that sequence. If the offer is rejected, their income from the current period is zero. At the end of the period, the sequence continues with probability 0.95. If the sequence continues, subjects who have not accepted an offer are required to enter another reservation wage and the process repeats. At the end of the sequence, subjects are informed of their points earnings from the sequence, which is simply the sum of points earnings from all periods in the sequence. In this setting expected points earnings are maximized by choosing a constant reservation wage $r^* = 725$ (see Appendix B.1).

Subjects complete 10 sequences, each sequence having the same structure described above. All offers are independent draws across subjects, periods and sequences. At the end of the tenth sequence one sequence is randomly chosen for each session and points earnings from this sequence are used to determine subjects' monetary earnings. Subjects receive a show-up fee of 5.00 GBP plus additional earnings from the chosen sequence, converted at a rate of 3,000 points = 1.00 GBP.

[4]Subjects are required to enter the reservation wage within 15 seconds. The time restriction forces subjects to complete a period at roughly the same time, facilitating the synchronization of feedback. In the experimental instructions we refer to the reservation wage as a "minimum acceptable offer"; see instructions in Appendix A for details. We have subjects enter reservation wages rather than make binary accept/reject decisions in order to obtain more information about their search strategy. This technique was first applied in search tasks by Oaxaca & Cox (1992).

All the information above is described carefully to subjects in the instructions which were handed out to subjects and read out loud at the beginning of the experiment. After reading out the instructions, control questions were given to ensure that subjects understood essential information about the search environment. See Appendix A for a copy of instructions and control questions.

3.2 Treatments

To allow us to study the effect of social comparison, we manipulate across treatments the feedback received by subjects at the end of each period. In the simplest Isolated treatment, the feedback received by subjects in each period consists only of information on their own offer, whether it is accepted, the resulting period income and their total income across all periods in that sequence. In the Partner and Partner-Offer treatments subjects are randomly paired in each sequence. The random termination of search sequences, which is implemented independently for each subject in the Isolated treatment, is implemented independently at the pair level in the Partner and Partner-Offer treatments. In all three treatments, offers are independent across subjects and an additional control question is added in the Partner and Partner-Offer treatments to ensure that subjects understand that own and partner offers are drawn independently.

In the Partner treatment subjects are additionally shown their partner's income in each period. They are therefore aware of whether or not their partner has accepted an offer, and the amount of that offer if it was accepted. The Partner treatment allows for relatively little social feedback because subjects only learn their partner's income each period. Subjects whose partner has an income of zero cannot tell whether this is because their partner has a high reservation wage, or because their partner received low offers. This also means that there is relatively little within-sequence variation in the feedback received. The partner's per-period income is either zero (meaning the partner has not yet accepted an offer) or it is constant across periods.

In the Partner-Offer treatment, subjects are again randomly paired and receive information about partner income at the end of each period. In addition, subjects are also shown the offer made to their partner, and whether or not their partner accepted or rejected that offer. Thus the Partner-Offer treatment allows for more feedback and more within-sequence variation. It also allows us to test whether social feedback on offers as well as income has effects on search behavior.

The main features of the design are summarized in Table 1. Each session consisted of 12 subjects. We conducted six sessions for each treatment. No subject participated in more than one session.

Table 1: Treatment Design

	Isolated	Partner	Partner-Offer
Sessions	6	6	6
Number of subjects	12	12	12
Sequences	10	10	10
Paired Subjects	No	Yes	Yes
Mutual Feedback on			
Offer	No	No	Yes
Income	No	Yes	Yes

3.3 Discussion of the design

The structure of the experiment provides three sources of variation which allow us to test whether subjects respond to social feedback. First, we can compare decisions (i.e. reservation wages) across treatments which vary in the availability of social feedback. Second, within a sequence we can examine whether decisions change in a predictable way in response to information about the partner. Third, across sequences we can examine whether the decisions and outcomes of partners in earlier sequences affect decisions in the current sequence.

One reason we may observe within-sequence social comparison effects in the Partner and Partner-Offer treatments is that subjects may have distributional preferences. For example, if subjects care about earnings differentials as well as own earnings the individual choice problem becomes a dynamic game. In Appendix B.2 we analyze this game. Assuming symmetric preferences and complete information about preferences, the initial reservation wage is very close to the expected earnings maximizing reservation wage r^*. The initial reservation wage remains constant until one of the job-seekers accepts an offer. Note that any rejected offers have no effect on reservation wages. After the partner exits, the remaining job-seeker adopts a new, constant reservation wage. The new reservation wage is increasing in the partner's accepted offer, but in expectation is lower than the initial reservation wage. We refer to the positive relationship between a partner's accepted offer (i.e. income) and the remaining job-seeker's reservation wage as a reference wage effect. See Appendix B.2 for details.

Within-sequence social comparison effects can also arise from a desire to imitate or conform to the partner's decision. In the Partner and Partner-Offer treatments, the feedback allows the subjects to make (limited) inferences about partners' reservation wages. Consider a subject with reservation wage r. If partner j accepts an offer lower than r, the subject can infer $r^j < r$. Now consider a subject who only desires to imitate the reservation wage chosen by their partner. If they observe the partner accept an offer they would have rejected, they should reduce their reservation wage, and their new reservation wage will be no greater than the accepted offer. In the Partner-Offer treatment there is an additional scenario that would induce an imitative subject to change their reservation wage. If partner j rejects an offer higher than r, the subject can infer $r^j > r$. They should increase their reservation wage, and their new reservation wage will be no smaller than the rejected offer.

Note that the reference wage effect and the inference effect predicted by imitation are largely observationally equivalent, and consequently difficult to disentangle. However, with our design, the Partner-Offer treatment offers a testable difference: the rejected offers of partners have no impact according to the reference wage effect, whereas they have a positive impact according to the inference effect.

The fact that we have repeated search sequences also allows us to test for an effect of social feedback across sequences. In the Isolated treatment, subjects can learn about how their own strategies affect sequence earnings and, based on prior literature (see Section 2.1), experience from earlier sequences may improve their search efficiency in later sequences. In the social feedback treatments, the additional information about partner's strategies and earnings might be expected to enhance this process. To examine this, we study whether a subject's reservation wage changes in a predictable way in response to their partner's decisions and outcomes in the previous sequence.

4 Results

216 subjects who were recruited through ORSEE (Greiner 2004) participated in the 18 sessions. None of the subjects had participated in a search experiment before. All sessions lasted for approximately 50 minutes, and earnings averaged 10.11GBP per subject inclusive of the show-up fee. The experiment was computerized using the z-Tree program (Fischbacher 2007) and conducted in the CeDEx laboratory at the University of Nottingham in March and April 2015 and March 2016. Subjects were randomly assigned into Isolated, Partner and Partner-Offer treatments. Observable characteristics are similar across the treatments, as shown in Table 2. The differences in proportions are insignificant according to pooled chi-square tests (p-values are reported in the last column).[5]

[5]Throughout the paper, reported p-values are two-sided.

Table 2: Observable characteristics of subjects across treatments

Treatment	Isolated		Partner		Partner-Offer		p-value from χ^2 test
Female	45	(62.5%)	44	(61.11%)	49	(68.06%)	0.656
Postgraduate	6	(8.33%)	6	(8.33%)	6	(8.33%)	1.000
Field of study							
Science	34	(47.22%)	37	(51.39%)	39	(54.17%)	0.703
Social Science	30	(41.67%)	22	(30.56%)	22	(30.56%)	0.268
Arts	8	(11.11%)	13	(18.06%)	11	(15.28%)	0.498

Notes: Sciences include Engineering and Medicine and Health Sciences. Double majors are classified as Sciences if a science major is combined with another major, or as Social Sciences if a social science major is combined with arts major.

We observe 2,160 sequences of search (3 treatments × 6 sessions × 12 subjects × 10 sequences), which contain 4,749 decision-making periods.[6] 5.79% of sequences were censored, which means the subject was still searching when the sequence was terminated by the computer and no offer was accepted in that sequence.

Table 3 summarizes levels and changes in reservation wages for each treatment. It shows that the two regularly-observed departures from the theoretical predictions discussed in Section 2.1 are replicated in all treatment conditions of our experiment. First, in all treatments average reservation wages are below the reservation wage of an expected earnings maximizer ($r^* = 725$). Panel (a) of Table 3 reports average initial (period 1) reservation wages of 539, 555 and 512 in the Isolated, Partner and Partner-Offer treatments respectively, with 95% confidence intervals easily excluding r^*.[7] As a result of these low reservation wages, search sequences tend to be short (the average duration of search in our treatments is 2.19 periods), and subjects often exit with an offer below r^* (37.45% of the sequences in our sample). Average reservation wages in the complete sample summarized in Panel (b) are slightly higher than average initial reservation wages, mainly due to a selection effect (subjects who set lower reservation wages tend to exit search earlier and so are under-represented in the sample), but still significantly below

[6] In 7 periods, the subject passed the 15-second time limit, therefore they did not enter a reservation wage and consequently the offer was rejected for these subjects. This happened to 6 different subjects, 1 in the Isolated, 1 in the Partner and 4 in the Partner-Offer treatment.

[7] Throughout the paper, standard errors are clustered at the session level.

Table 3: Overview of reservation wages across treatments, pooled across sequences

	Obs.	Mean	Std. Err.	95% C.I.	
(a) Initial period					
Isolated	719	538.59	23.08	(479.26	597.91)
Partner	719	555.07	40.36	(451.33	658.81)
Partner-Offer	717	512.00	10.61	(484.71	539.28)
(b) Overall average					
Isolated	1,575	586.85	14.51	(549.56	624.15)
Partner	1,587	585.42	29.03	(510.80	660.04)
Partner-Offer	1,580	543.10	15.01	(504.53	581.68)
(c) Within sequence per-period change					
Isolated	855	−26.50	4.53	(−38.15	−14.85)
Partner	867	−29.81	3.65	(−39.18	−20.43)
Partner-Offer	859	−32.47	3.24	(−40.81	−24.13)

Notes: 7 periods in which the subject fails to enter a decision before the time limit (0.1% of active periods) are excluded from the summary.

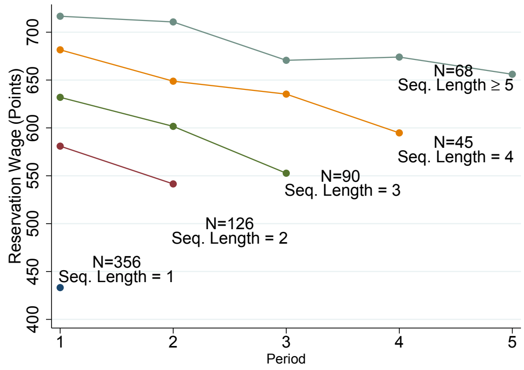
r^*. This finding is consistent with the existing experimental literature. For example, our average reservation wage is just below 80% of r^*, and a similar ratio can be calculated from the average reported in Brown et al. (2011).

Second, in all treatments we consistently observe a declining reservation wage within sequences. Panel (c) of Table 3 shows that the average per-period change in the reservation wage is −27, −30 and −32 in the Isolated, Partner and Partner-Offer treatments. The 95% confidence intervals all exclude zero. Figure 1 shows this graphically by plotting the average reservation wage across periods, conditional on search length.[8] For all subsamples, the reservation wage is declining in all treatments. This finding is also consistent with the existing experimental literature, see for example Braunstein & Schotter (1982) and Brown et al. (2011).[9]

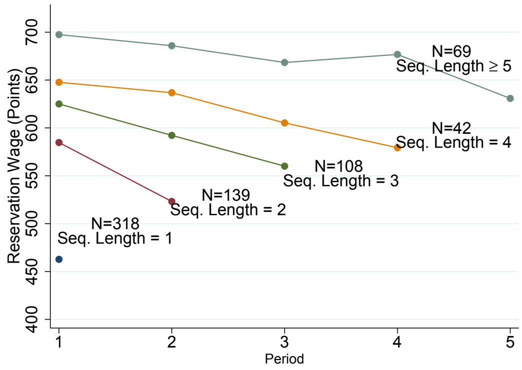
[8]We condition on search length because subjects with higher reservation wages will tend to have longer search durations. If we did not condition on search length, the average reservation wage would increase across periods as subjects with lower reservation wages exit faster, even if subjects have constant reservation wages.

[9]Indirect evidence of the declining reservation wage also comes from studies which do not elicit a reservation wage but allow subjects to recall offers. In these studies, many subjects exercise the option to recall offers that have been previously rejected (Hey 1987, Kogut 1990).

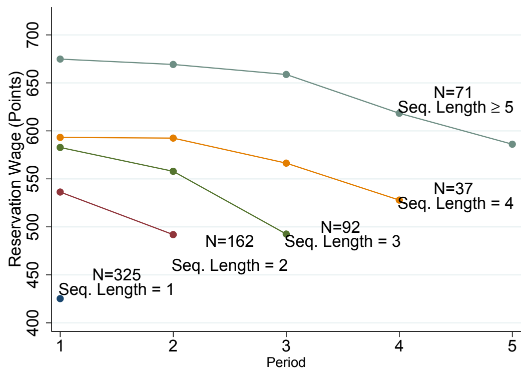
Figure 1: Reservation wage by search length



(a) Isolated treatment



(b) Partner treatment



(c) Partner-Offer treatment

Notes: N in each figure refers to the number of sequences with that search length. To ensure that sequences are not selected into the subsamples by random termination, 106 sequences (4.91%) which are censored due to termination before the fifth period are not included in the summary. The five sequences in which the subject passed the time limit for the initial period are also excluded.

At an aggregate level, we find strong similarities across treatments. Panels (a) and (b) of Table 3 show that average reservation wages do not differ significantly across treatments. Panel (c) of Table 3 also shows that the decline in reservations wages within a sequence does not differ significantly across treatments. However, in the next two sections we analyze the data at a more disaggregated level and show that subjects systematically respond to social feedback in our Partner and Partner-Offer treatments, both within and between sequences.

4.1 The impact of social feedback within sequences

To test whether subjects are responding to their partner's search feedback, we compare the decisions made before and after feedback is received. To do this, we focus on the difference between the reservation wage in period t and the reservation wage in the previous period $t-1$. Search feedback from the partner is characterized by two key variables. First, an indicator of whether subject i's partner j accepted an offer in the previous period. Second, the value of the offer received by j in the previous period. These variables are only defined in periods in which subject i is still searching at t, and their partner j was still searching at $t-1$, and therefore the sample used in the analysis in this section consists of those observations from periods t in which the subject's partner was still searching at $t-1$. In the Isolated treatment subjects do not have a partner, we therefore create artificial partners by pairing subjects randomly.[10] The artificial partners do not provide any feedback, and hence are used for placebo tests.

There are 1,678 periods in the sample, which is 35.19% of all the decision-making periods. The initial periods of a sequence (2,160, 45.48%) are excluded because no feedback from the partner is possible. Similarly, periods in which the partner exited before $t-1$ (910, 19.16%) are excluded because, again, no feedback is possible at t.[11] Almost all subjects (96.76%) are included in the sample for one or more sequences (the average is 5.28 sequences per subject), and observations are fairly evenly distributed across sequences.

In Figure 2 we plot the correlation between the change in subject i's reservation wage and the value of the offer received by their partner. We do this separately, by treatment, for those cases where j rejected the offer (Panels (a)–(c)) and those cases where j accepted the offer (Panels (d)–(e)). We separate in this way because accepted offers lead to a change in partner's income, whereas rejected offers do not. The sample size, the Pearson

[10] The particular pairing used is the same random pairing as in the Partner treatment.

[11] In addition, 8 periods (0.17%) in which the subject timed out in the current or the previous period are also excluded.

correlation coefficient and p-value are given at the top of each panel, and in addition we display a scatter plot of the average change in the reservation wage and average value of the partner's offer for each decile of the partner's offer (10 data points) and a linear fit. As noted earlier, Panels (a) and (d) are placebo conditions. Panel (b) is also a placebo condition because there is no feedback on rejected offers in the Partner treatment. As expected, correlations in all the placebo conditions are insignificant. The correlation between the change in reservation wage and partner's rejected offer is also small and insignificant (Panel (c)). The patterns are quite distinct in those cases in the Partner and Partner-Offer treatments where the partner accepts the offer (Panels (e) and (f)). The change in reservation wage is significantly and positively correlated with partner's offer, with a correlation coefficient of 0.144 ($p = 0.025$) and 0.179 ($p = 0.006$).

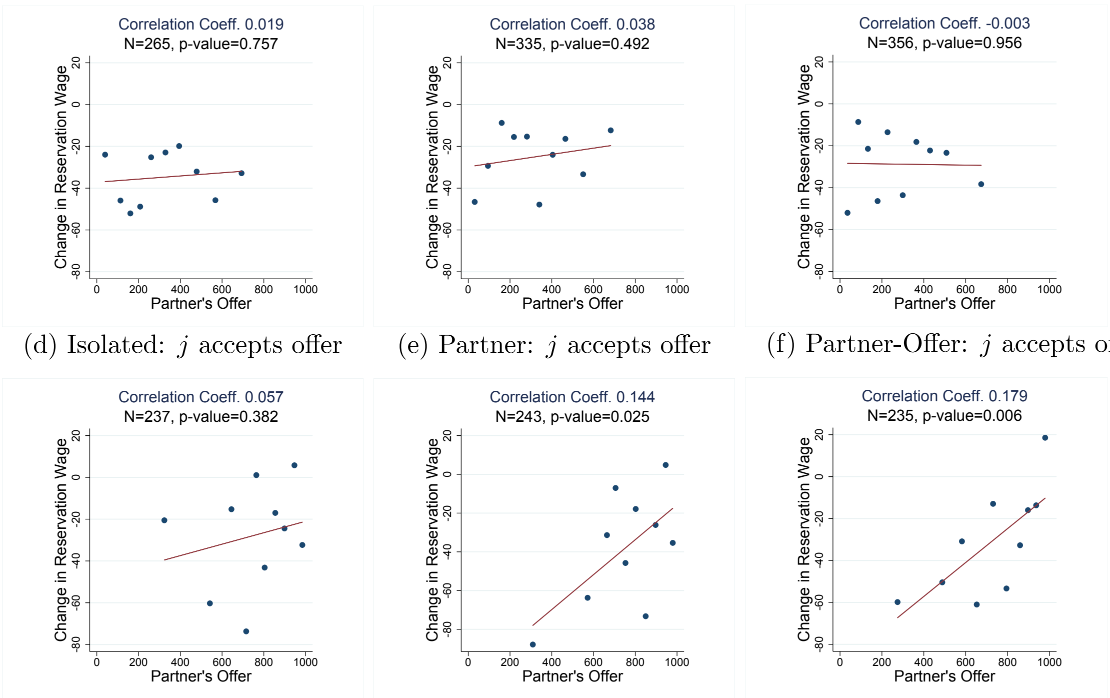
To quantitatively estimate how subjects are influenced by social comparisons, we estimate the following model for each treatment:

$$r_{is,t} - r_{is,t-1} = \beta_0 + \beta_1 a^j_{is,t-1} + \beta_2 (a^j_{is,t-1} \cdot w^j_{is,t-1}) + \beta_3 w^j_{is,t-1} + \lambda_t + \theta_s + \eta_i + \epsilon_{is,t} \quad (1)$$

The subscripts i, s and t are identifiers for, respectively, subject, sequence and period. The dependent variable is the change in the reservation wage relative to the previous period. The explanatory variables are an indicator for whether the partner accepted their offer in period $t-1$ ($a^j = 1$ for acceptance and 0 for rejection), the value of the partner's offer in period $t-1$ (w^j) and the interaction of the acceptance indicator and the offer, which is the period $t-1$ income of the partner. We control for period (λ_t) and sequence (θ_s) fixed effects, and allow for subject random effects η_i.

In the Isolated treatment a^j and w^j are not observed, so changes in the reservation wage must be independent of these variables by design, and so β_1, β_2 and β_3 should be zero. In the Partner treatment a^j is observed but w^j is only observed if $a^j = 1$, so β_3 should be zero. In the Partner-Offer treatment, both a^j and w^j are observed in every

Figure 2: Correlation between changes in reservation wage and partner's offer



(a) Isolated: j rejects offer (b) Partner: j rejects offer (c) Partner-Offer: j rejects offer

(d) Isolated: j accepts offer (e) Partner: j accepts offer (f) Partner-Offer: j accepts offer

Notes: We separate the observations in each treatment by the decision of the partner (or placebo partner for the Isolated treatment). The Pearson correlation between partner's offer and changes in reservation wage, and unadjusted, significance level are given at the top of each panel. The panels display the binned scatter plots: for each decile of partner's offers in the subsample, we summarize and plot the average change in the reservation wage and the average of partner's offer. Also shown is the fitted linear relationship among the 10 dots. This method displays the correlation more clearly; details of this method can be found in Stepner (2013).

period and so β_1, β_2 and β_3 might all be different from zero if subjects respond to this information.

Estimates of (1) are reported in Table 4.[12] On average across all period and sequences in the sample, subjects reduced their reservation wage by about 30 points per period. This is very similar to the per-period decline reported in Table 3 and Figure 1. In the Isolated treatment, as expected, $\hat{\beta}_1$, $\hat{\beta}_2$ and $\hat{\beta}_3$ are all small and insignificantly different from zero. In the Partner and Partner-Offer treatments, however, $\hat{\beta}_1$ is significant and negative, indicating that a subject whose partner exits in the previous period lowers

[12]The results are robust to alternative specifications, such as dropping the period and sequence dummies, or the addition of controls for observable characteristics, see Table C2 in Appendix C.

their reservation wage by 60–70 points more than they otherwise would. $\hat{\beta}_2$ is significant and positive in the Partner and Partner-Offer treatments, showing that the value of the accepted offer is also relevant. A subject whose partner accepts a higher offer increases their reservation wage with a slope of approximately 0.1 ($\hat{\beta}_2+\hat{\beta}_3$). Our theoretical analysis of job-seekers with Fehr-Schmidt preferences predicts that the slope varies between 0.13 and 0.34 depending on the intensity of preferences (see Table B1 in Appendix B.2 for details).

The exit and income effects together imply that a subject whose partner exits may increase or reduce their reservation wage in the next period, depending on the value of the partner's exit wage. Given the average exit wage of the partner is 746 (Partner treatment) and 718 (Partner-offer treatment), model (1) predicts a very small negative effect of partner exit on reservation wage. This leads to a small predicted increase in the probability of exit in the period after a partner exits of less than 1%.[13] Our theoretical analysis also predicts that the expected probability of exiting increases for the remaining job-seeker by 1% to 3% depending on the preferences (also see Table B1).

In contrast to the estimated effect of accepted offers ($\hat{\beta}_2 + \hat{\beta}_3$), offers which are rejected appear to have no impact on subjects' reservation wages: $\hat{\beta}_3$ is small and insignificantly different from zero in all treatments.

These regression results reinforce the findings reported in Figure 2. First, all estimated coefficients in placebo conditions are insignificant. Second, the results reproduce the positive correlation between the partner's income and the change in the subject's reservation wage in the Partner and Partner-Offer treatments. Third, the results reproduce the insignificant effect of rejected offers on reservation wages in the Partner-Offer treatment. The latter two findings are consistent with the Fehr-Schmidt model analyzed in Appendix B.2.

[13]This small effect helps to explain why the change in the reservation wage is similar in the Isolated and social feedback treatments.

Table 4: Change in reservation wage between periods as a function of partner's offer and acceptance decision.

	(1) Isolated	(2) Partner	(3) Partner-Offer
Mean Δr	-31.538	-30.702	-29.844
β_1 j accepted offer (a^j)	-16.621	-71.205^{**}	-63.645^{***}
	(11.813)	(33.313)	(18.923)
β_2 j's income ($a^j w^j$)	0.029	0.092^{**}	0.088^{***}
	(0.026)	(0.046)	(0.027)
β_3 value of j's offer (w^j)	0.002	-0.006	-0.002
	(0.016)	(0.022)	(0.013)
Subject random effects	Yes	Yes	Yes
Period fixed effects	Yes	Yes	Yes
Sequence fixed effects	Yes	Yes	Yes
Number of obs.	502	578	591
Number of sessions	6	6	6

Notes: Standard errors are in parentheses.

The second finding is also consistent with a model of imitation. As noted earlier, in our setting, subjects can make inferences about their partner's reservation wages when they observe their partner's income. When a subject observes their partner accept an offer below their own reservation wage they can infer that the partner's reservation wage is lower than their own. If the subject wishes to imitate they will lower their own reservation wage. For a fixed initial own reservation wage the reduction will be larger the lower the accepted offer. However, imitation would also imply an analogous rejected offer effect when the subject observes their partner reject an offer above their own reservation wage. We do not observe such an effect in either Figure 2c or Table 4.

In summary, the within-sequence feedback leads to systematic changes in reservation wages. The patterns in our data are qualitatively consistent with the reference wage effect predicted by Fehr-Schmidt preferences: job-seekers reduce their reservation wage when their partner exits, but the new reservation wage is increasing in the partner's income. The fact that the reservation wage is increasing in the partner's income is also consistent with a model of imitation. However, imitation would also imply that reservation wages increase with the partner's rejected offer, and we find no evidence of this in the Partner-Offer treatment.

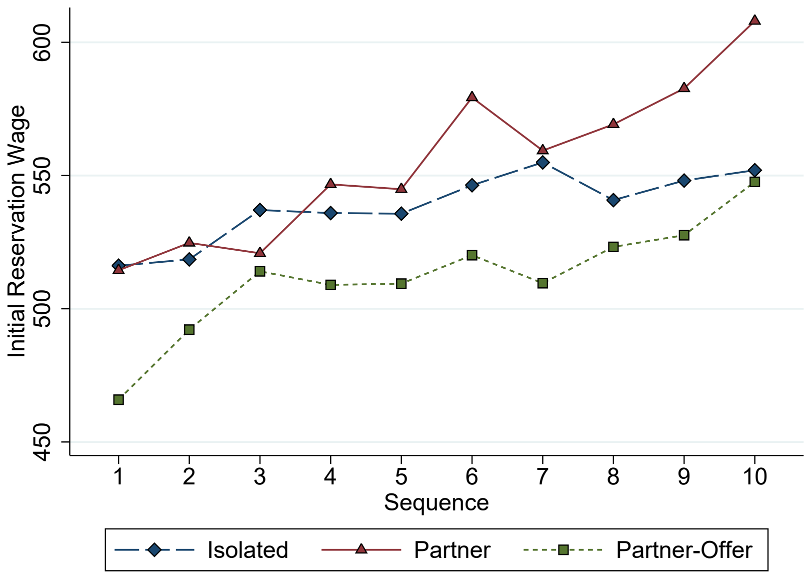
4.2 Impact of social feedback between sequences

We now consider whether feedback also changes reservation wages between sequences. We view between-sequence changes in behavior as driven by learning rather than distributional preferences, since subjects and their partners are randomly re-paired at the end of each sequence, and only one randomly-drawn sequence is used to determine earnings.

In Figure 3 we plot the average period 1 reservation wage in each sequence across all 10 search sequences. We use period 1 reservation wages for this comparison because reservation wages in period 1 are not yet influenced by the within-sequence feedback documented in the previous section. Figure 3 shows that for all three treatments there is evidence of increasing reservation wages across sequences, but this increase is larger for the Partner and Partner-Offer treatments. A linear trend estimated separately for each treatment yields a slope of 9 points (standard error 2) per sequence in the Partner treatment, 6 (3) in the Partner-Offer treatment and 3 (3) in the Isolated treatment. This implies that, in the Partner treatment, subjects choose a reservation wage 16.63% higher in the final sequence compared to the first sequence. In the Partner-Offer treatment, this increase is estimated to be 11.71%. In the Isolated treatment, this increase is estimated to be 6.43%. However, although the sequence trend is significantly different from zero only in the treatments with social feedback, the difference in sequence trend between Partner and Isolated treatments is only marginally significant ($p = 0.067$), and the difference between Partner-Offer and Isolated treatments is insignificant ($p = 0.499$).[14]

[14] The findings are robust to the inclusion of subject characteristics, reported in Table C3. Table C3 also shows that the sequence trend of exit period reservation wage is positive and significantly different from zero in all treatments, but is higher in the social feedback treatments (and again the difference is only significant between Partner and Isolated treatments). We focus on the period 1 reservation wages in analyzing the between-sequence effects because it is not contaminated by the within-sequence effects analyzed in the previous section.

Figure 3: Period 1 reservation wages by treatment and sequence



An obvious question is whether these differences in the sequence trend of period 1 reservation wages is due to the feedback which subjects receive in the Partner and Partner-Offer treatments. We can test this by examining whether the trend in reservation wages across sequence is affected by the particular feedback received by subjects from their partners in previous sequences. Specifically, we examine whether subjects whose partners accepted higher offers in the previous sequence choose higher reservation wages in the current sequence, and whether subjects whose partners searched for longer in the previous sequence choose higher reservation wages in the current sequence. Each subject-sequence is categorized into the following four types, according to the behavior and outcome of their partner in the previous sequence:

No, No: j did not accept a better offer and did not search for longer;

No, Yes: j did not accept a better offer but searched for longer;

Yes, No: j accepted a better offer but did not search for longer;

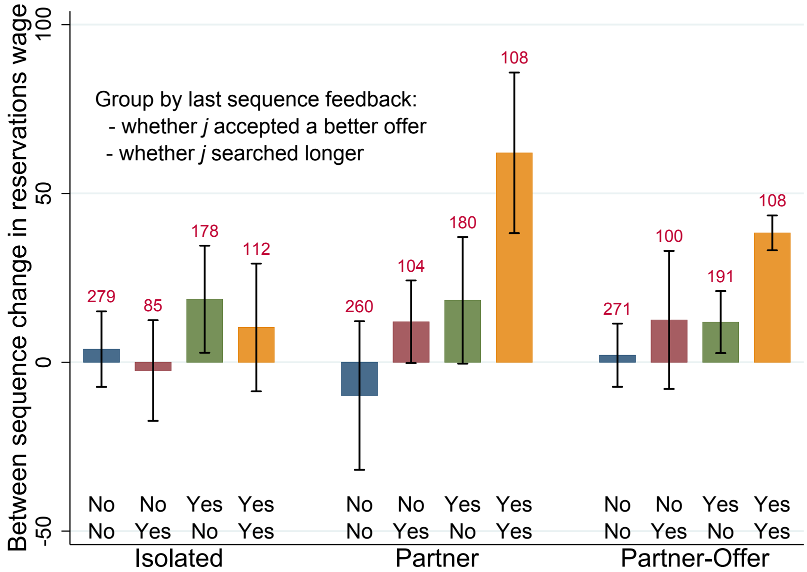
Yes, Yes: j accepted a better offer and searched for longer.

The average change in reservation wages for each type is reported in Figure 4. In the

Isolated treatment, information on partner's performance in previous sequences is not available, and as before we use a randomly-selected placebo partner. As expected, the behavior of this placebo partner has no impact on reservation wages. In the Partner treatment, however, subjects increased the reservation wage by 62 points between sequences when they were previously paired with a partner who searched longer and who accepted a higher offer in the previous sequence (Yes, Yes). This increase in the reservation wage is significantly higher than the cases in which the partner earned more without searching for longer (Yes, No) ($p = 0.007$), or when the partner did not earn more despite having searched for longer (No, Yes) ($p = 0.003$), or when partner did not search for longer and did not exit with a higher offer (No, No) ($p = 0.001$). The equivalent increase in the (Yes, Yes) case in the Partner-Offer treatment is 38 points, which is also significantly higher than the other three cases within that treatment ($p = 0.000$ compared to (Yes, No) case, $p = 0.014$ compared to (No,Yes) case, $p = 0.000$ compared to the (No, No) case). The (Yes, Yes) cases in both Partner and Partner-Offer treatments are significantly different from the placebo cases from the Isolated treatment ($p = 0.000$ for the difference between Partner and Isolated treatments, and $p = 0.003$ between Partner-Offer and Isolated treatments).

This supports a naive "imitate if better" hypothesis. Recall that, on average, subjects chose a reservation wage substantially below the earning maximizing level of 725 (see Table 3). Therefore subjects whose partners accepted higher offers and who searched for longer were typically observing behavior which was closer to this earning maximizing level. These subjects increased their own reservation wage by more in response. The response in the Partner-Offer treatment is smaller than the Partner treatment (though not significantly so). This suggests that the additional feedback on Partner's rejected offers did not contribute to increased reservation wage in later sequences. These between-treatment differences suggest that social feedback enhances learning, leading to the subjects in the Partner and Partner-Offer treatments choosing a closer to earnings-maximizing strategy

Figure 4: Impact of partner's decision and outcome in the previous sequence on the change in the reservation wage between sequences



Notes: The confidence intervals indicated by the brackets are estimated using the following model, separately for each treatment:
$r_{is1} - r_{i(s-1)1} = \beta_0 + \beta_1 d^L_{i(s-1)1} + \beta_2 d^O_{i(s-1)1} + \beta_3 d^L_{i(s-1)1} \times d^O_{i(s-1)1} + \eta_i + \epsilon_{is1}$,
where d^L and d^O are dummy indicators for j searched longer and j exited with a higher offer. Subject random effects are included. The sample size for each category is labeled at the top of the confidence interval. We exclude the 8.52% cases in which the previous sequence is terminated before the subject or their partner accepts an offer.

in later sequences.

5 Discussion and Conclusions

It is widely recognized that social interaction matters for outcomes in labor markets. However, the existing literature has tended to focus on network effects, whereby social networks provide additional options and information about those options. In this paper we use an experimental setting to investigate an alternative channel for social interactions to influence search: social comparison effects.

Our experiment employs a search task based on McCall's (1970) canonical model of labor market search, which offers predictions for optimal search decisions in a known search environment. Similar search tasks have been examined in the earlier experimental literature. To implement the stationary infinite-horizon decision-making problem, we use a random termination method whereby subjects search in an uncertain time horizon. In this setting, the strategy that maximizes expected earnings is to adopt the same constant reservation wage rule predicted by the infinite-horizon model.

In the treatment where subjects search in isolation, the findings from the previous literature are replicated in our search task with random termination. Subjects tend to set lower reservation wages than is consistent with maximizing expected earnings, and they tend to decrease reservation wages over the course of a search task.

We then consider how social comparisons affect search behavior. We conduct two treatments in which subjects are paired and complete independent search tasks. During the task they receive information about partner's search, but importantly their decisions have no direct effect on the partners' offer process. Thus our experiment excludes possible network effects.

In one treatment we allow subjects to observe a partner's income at the end of each period. This information is available both during search and after offer acceptance; these two states are analogous to the search and employment spells in a job-seeker's labor market experience. In another treatment we also allow subjects to observe offers received by a partner. This in addition to the partner's acceptance/rejection decision gives additional information about the partner's reservation wage. Such social comparisons may affect search due to distributional preferences or learning effects.

In these novel treatments we show that social comparisons have a real impact on search decisions. First, we find that when a subject observes their partner exit with a low wage they tend to decrease their reservation wage by more than they otherwise would, and if they observe their partner exit with a high wage they tend to decrease their reservation wage by less than they otherwise would. Second, compared with our control treatment, we observe greater increases in initial reservation wages across search tasks in our treatments that allow social comparisons.

Some of these findings are qualitatively consistent with a reference wage effect driven by distributional preferences. For example, applying the Fehr-Schmidt model of inequality aversion to our setting, an active searcher's reservation wage increases with the income of a partner over a particular range of parameter values. However, social preference models cannot give a complete explanation for differences between our treatments. For example, they fail to account for stronger between-sequence changes in initial reservation wages in our treatments allowing social comparisons. This finding is better accounted for by a learning explanation whereby subjects tend to imitate the choices of more successful partners.

The social comparison effects we observe imply that job-seekers who search in a social environment will have an increased job-finding rate after their partner has found a job, because their reservation wage declines. Thus, the difference in search duration between partners will be smaller than in the case of two isolated job-seekers. The effects also imply that job-seekers who search in a social environment will have positively correlated wages even when the offer distributions they face are uncorrelated, because the partner's exit wage influences the remaining job-seeker's reservation wage.

An obvious question is whether the social comparison effects we observe are relevant to real job-search settings. We note that the social interaction in our experiment is very limited; the subjects in our various treatments experience a very similar environment, the only difference being limited to information about an anonymous other. In real job search environments we expect social interaction to be much richer. We see no reason to suppose that social comparison effects would be weaker in the richer environment. This question could be further explored in future research which varies the form of social interaction.

We hypothesise that with richer interaction, for example allowing communication between subjects, we would observe stronger social comparison effects. We leave such issues to further research.

References

Abeler, J., Altmann, S., Kube, S. & Wibral, M. (2010), 'Gift exchange and workers' fairness concerns: When equality is unfair', *Journal of the European Economic Association* **8**(6), 1299–1324.

Akerlof, G. A. & Yellen, J. L. (1990), 'The fair wage-effort hypothesis and unemployment', *The Quarterly Journal of Economics* **105**(2), 255–283.

Altmann, S., Armin, F., Jäger, S. & Zimmermann, F. (2015), Learning about job search: A field experiment with job seekers in Germany, Technical report, CEPR Discussion Paper No. DP10621.

Angelova, V., Güth, W. & Kocher, M. G. (2012), 'Co-employment of permanently and temporarily employed agents', *Labour Economics* **19**(1), 48–58.

Bandura, A. & Walters, R. H. (1977), 'Social learning theory'.

Belot, M., Kircher, P. & Muller, P. (2015), Providing advice to job seekers at low cost: An experimental study on on-line advice, Technical report, Edinburgh School of Economics, University of Edinburgh.

Bohnet, I. & Zeckhauser, R. (2004), 'Social comparisons in ultimatum bargaining', *The Scandinavian Journal of Economics* **106**(3), 495–510.

Bolton, G. E. & Ockenfels, A. (2000), 'ERC: A theory of equity, reciprocity, and competition', *American Economic Review* **90**(1), 166–193.

Braunstein, Y. M. & Schotter, A. (1982), 'Labour market search: an experimental study', *Economic Inquiry* **20**(1), 133–144.

Brown, M., Flinn, C. J. & Schotter, A. (2011), 'Real time search in the laboratory and the market', *The American Economic Review* **101**(2), 948–974.

Bursztyn, L., Ederer, F., Ferman, B. & Yuchtman, N. (2014), 'Understanding mechanisms underlying peer effects: Evidence from a field experiment on financial decision', *Econometrica* **82**, 1273–1301.

Cai, H., Chen, Y. & Fang, H. (2009), 'Observational learning: Evidence from a randomized natural field experiment', *American Economic Review* **99**(3), 864–82.

Cai, J., De Janvry, A. & Sadoulet, E. (2015), 'Social networks and the decision to insure', *American Economic Journal: Applied Economics* **7**(2), 81–108.

Cappellari, L. & Tatsiramos, K. (2015), 'With a little help from my friends? Quality of social networks, job finding and job match quality', *European Economic Review* **78**, 55 – 75.

Card, D., Mas, A., Moretti, E. & Saez, E. (2012), 'Inequality at work: The effect of peer salaries on job satisfaction', *American Economic Review* **102**(6), 2981–3003.

Charness, G. & Kuhn, P. (2007), 'Does pay inequality affect worker effort? experimental evidence', *Journal of labor economics* **25**(4), 693–723.

Cingano, F. & Rosolia, A. (2012), 'People I know: Job search and social networks', *Journal of Labor Economics* **30**(2), 291–332.

Clark, A. E. (2003), 'Unemployment as a social norm: Psychological evidence from panel data', *Journal of labor economics* **21**(2), 323–351.

Clark, A. E., Masclet, D. & Villeval, M. C. (2010), 'Effort and comparison income: Experimental and survey evidence', *ILR Review* **63**(3), 407–426.

Clark, A. E. & Oswald, A. J. (1996), 'Satisfaction and comparison income', *Journal of Public Economics* **61**(3), 359 – 381.

Cohn, A., Fehr, E., Herrmann, B. & Schneider, F. (2014), 'Social comparison and effort provision: Evidence from a field experiment', *Journal of the European Economic Association* **12**(4), 877–898.

Conley, T. G. & Udry, C. R. (2010), 'Learning about a new technology: Pineapple in Ghana', *American Economic Review* **100**(1), 35–69.

Cox, J. & Oaxaca, R. (2000), 'Good news and bad news: Search from unknown wage offer distributions', *Experimental Economics* **2**, 197–225.

Dal Bó, P. & Fréchette, G. R. (2017), 'On the determinants of cooperation in infinitely repeated games: A survey', *Journal of Economic Literature* **forthcoming**.

Dustmann, C., Glitz, A. & Schönberg, U. (2016), 'Referral-based job search networks', *The Review of Economic Studies* **83**(2), 514–546.

Falk, A., Huffman, D. & Sunde, U. (2009*a*), Do I have what it takes? Equilibrium search with type uncertainty and non-participation. IZA Discussion Paper No. 2531.

Falk, A., Huffman, D. & Sunde, U. (2009*b*), Self-confidence and search. IZA Discussion Paper No. 2525.

Fehr, E. & Schmidt, K. M. (1999), 'A theory of fairness, competition, and cooperation', *The Quarterly Journal of Economics* **114**, 817–868.

Festinger, L. (1954), 'A theory of social comparison processes', *Human relations* **7**(2), 117–140.

Fischbacher, U. (2007), ‘z-tree: Zurich toolbox for ready-made economic experiments’, *Experimental Economics* **10**(2), 171–178.

Frank, R. H. (1984), ‘Are workers paid their marginal products?’, *The American economic review* **74**(4), 549–571.

Frank, R. H. (1985), *Choosing the right pond: Human behavior and the quest for status.*, New York: Oxford University Press.

Friedl, A., De Miranda, K. L. & Schmidt, U. (2014), ‘Insurance demand and social comparison: An experimental analysis’, *Journal of Risk and Uncertainty* **48**(2), 97–109.

Gächter, S., Nosenzo, D. & Sefton, M. (2012), ‘The impact of social comparisons on reciprocity’, *The Scandinavian Journal of Economics* **114**(4), 1346–1367.

Galenianos, M. (2013), ‘Learning about match quality and the use of referrals’, *Review of Economic Dynamics* **16**(4), 668–690.

Galenianos, M. (2014), ‘Hiring through referrals’, *Journal of Economic Theory* **152**, 304–323.

Gamba, A., Manzoni, E. & Stanca, L. (2017), ‘Social comparison and risk taking behavior’, *Theory and Decision* **82**(2), 221–248.

Greiner, B. (2004), *Forschung und wissenschaftliches Rechnen. GWDG Bericht 63*, Göttingen: Ges. für Wiss. Datenverarbeitung, chapter The online recruitment system ORSEE 2.0 - A guide for the organization of experiments in economics, pp. 79–93.

Haisley, E., Mostafa, R. & Loewenstein, G. (2008), ‘Subjective relative income and lottery ticket purchases’, *Journal of Behavioral Decision Making* **21**(3), 283–295.

Harrison, G. W. & Morgan, P. (1990), ‘Search intensity in experiments’, *The Economic Journal* **100**, 478–486.

Hey, J. D. (1981), ‘Are optimal search rules reasonable? And vice versa?(And does it matter anyway?)’, *Journal of Economic Behavior & Organization* **2**(1), 47–70.

Hey, J. D. (1982), ‘Search for rules for search’, *Journal of Economic Behavior & Organization* **3**(1), 65–81.

Hey, J. D. (1987), ‘Still searching’, *Journal of Economic Behavior & Organization* **8**(1), 137–144.

Horváth, G. (2014), ‘Occupational mismatch and social networks’, *Journal of Economic Behavior & Organization* **106**, 442–468.

Ibanez, M., Czermak, S. & Sutter, M. (2009), ‘Searching for a better deal–on the influence of group decision making, time pressure and gender on search behavior’, *Journal of Economic Psychology* **30**(1), 1–10.

Knez, M. J. & Camerer, C. F. (1995), 'Outside options and social comparison in three-player ultimatum game experiments', *Games and Economic Behavior* **10**(1), 65–94.

Kogut, C. A. (1990), 'Consumer search behavior and sunk costs', *Journal of Economic Behavior & Organization* **14**(3), 381–392.

Lahno, A. M. & Serra-Garcia, M. (2014), Peer effects in risk taking, Technical report, CESifo Working Paper: Behavioural Economics.

Linde, J. & Sonnemans, J. (2012), 'Social comparison and risky choices', *Journal of Risk and Uncertainty* **44**, 45–72.

Linde, J. & Sonnemans, J. (2015), 'Decisions under risk in a social and individual context: The limits of social preferences?', *Journal of Behavioral and Experimental Economics* **56**, 62–71.

Loewenstein, G. F., Thompson, L. & Bazerman, M. H. (1989), 'Social utility and decision making in interpersonal contexts', *Journal of Personality and Social psychology* **57**(3), 426.

Manski, C. F. (2000), 'Economic analysis of social interactions', *Journal of Economic Perspectives* **14**, 115–136.

Marmaros, D. & Sacerdote, B. (2002), 'Peer and social networks in job search', *European Economic Review* **46**, 870–879.

McCall, J. J. (1970), 'Economics of information and job search', *The Quarterly Journal of Economics* **84**(1), 113–126.

McGee, A. & McGee, P. (2016), 'Search, effort, and locus of control', *Journal of Economic Behavior & Organization* **126, Part A**, 89 – 101.

Moon, P. & Martin, A. (1990), 'Better heuristics for economic search: Experimental and simulation evidence', *Journal of Behavioral Decision Making* **3**(3), 175–193.

Moon, P. & Martin, A. (1992), 'Purchasing decisions, partial knowledge, and economic search experimental and simulation evidence', *Journal of Behavioral Decision Making* **5(4)**, 253–266.

Moon, P. & Martin, A. (1996), 'The search for consistency in economic search', *Journal of Economic Behavior & Organization* **29**, 311–321.

Oaxaca, R. L. & Cox, J. C. (1989), 'Laboratory experiments with a finite horizon job search model', *Journal of Risk and Uncertainty* **2**, 301–329.

Oaxaca, R. L. & Cox, J. C. (1992), 'Direct test of the reservation wage property', *The Economic Journal* **102**, 1423–1432.

Offerman, T. & Schotter, A. (2009), 'Imitation and luck: An experimental study on social sampling', *Games and Economic Behavior* **65**(2), 461–502.

Rohde, I. M. T. & Rohde, K. I. M. (2011), 'Risk attitudes in a social context', *Journal of Risk and Uncertainty* **43**(3), 205–225.

Schotter, A. & Braunstein, Y. M. (1981), 'Economic search: an experimental study', *Economic Inquiry* **19**, 1–25.

Schunk, D. (2009), 'Behavioral heterogeneity in dynamic search situations: Theory and experimental evidence', *Journal of Economic Dynamics & Control* **33**, 1719–1738.

Schunk, D. & Winter, J. (2009), 'The relationship between risk attitudes and heuristics in search tasks: A laboratory experiment', *Journal of Economic Behavior & Organization* **71(2)**, 347–360.

Soetevent, A. R. & Bruzikas, T. (2016), Risk and loss aversion, price uncertainty and the implications for consumer search (July 4, 2016). Tinbergen Institute Discussion Paper 16-049/VII.

Sonnemans, J. (1998), 'Strategies of search', *Journal of Economic Behavior & Organization* **35**, 309–332.

Sonnemans, J. (2000), 'Decisions and strategies in a sequential search experiment', *Journal of Economic Psychology* **21**(1), 91–102.

Stepner, M. (2013), 'BINSCATTER: Stata module to generate binned scatterplots', Statistical Software Components, Boston College Department of Economics.

Appendix A Instructions

[*] *indicates differences across treatments.*

Welcome! You are about to take part in a decision-making experiment. For participating in this experiment you will earn a show-up fee of 5. You can earn additional money depending on your decisions, so it is important that you read these instructions with care.

Please switch off your mobile phones. Communication with other participants is prohibited during the experiment. If you violate this rule, you will be dismissed from the experiment and you will forfeit all payments. If you have any questions, please raise your hand. A member of the experiment team will come and answer them in private.

The experiment will consist of 10 sequences. In each sequence you can earn points. After the completion of the experiment, the computer will randomly draw one sequence and all participants will receive additional earnings determined by the points they earned in that sequence. The points earned in that sequence will be converted to Pounds at the following rate:

$$3{,}000 \text{ points} = 1 \text{ Pound}$$

At the end of the experiment this amount plus your show-up fee of 5 will be paid to you privately in cash.

Description of a sequence

Each of the 10 sequences of the experiment has the same structure. Each sequence consists of multiple periods. Your total earnings from a sequence will be the sum of points you earn over the periods.

You will not know exactly how many periods there will be in a sequence until the sequence ends. The number of periods is determined by the computer following a simple rule: after each period, there is a 5% chance that the sequence ends and a 95% chance the sequence continues.

In period one, the computer will randomly draw an offer from 1 to 1000 points. Every offer is equally likely. Before you see the offer, you will be asked to choose a minimum offer that you would be willing to accept. The computer will then accept the offer for you if, and only if, it is above or equal to the minimum value you chose.

- If the offer is accepted, you earn that amount in period one and in every future period of the sequence.
- If the offer is rejected, your earnings from period one will be 0 and, if the sequence continues, you will receive a new offer in period two.

In period two, if you accepted the offer in period one you do not have to make a decision. Your earnings for the period will be equal to the offer you accepted in period one. If you rejected the offer in period one, you will again be asked for the minimum offer you would accept, and you will receive a new offer, which again will be accepted if and only if it exceeds your minimum acceptable offer.

- If the offer is accepted you earn that amount in period two and in every future period of the sequence.
- If the offer is rejected, your earnings from period two will be 0 and, if the sequence continues, you will receive a new offer in period three.

This process will continue until the sequence ends. Remember there is a 95% chance that the sequence continues, and a 5% chance that it ends, at the end of any period. At the end of the sequence your earnings for the sequence will be the sum of your earnings from each period in the sequence.

As long as you have not accepted an offer in the sequence, if the sequence continues to the next period you will get a new offer. The new offer will be drawn independently from the previous offers. This means in every period the offers from 1 to 1000 are equally likely regardless of what offers were made previously.

In each period where you have to enter a minimum acceptable offer you are required to enter it within 15 seconds. If you do not enter a minimum acceptable offer before the time limit is reached, the computer will automatically reject the offer in that period. The following examples illustrate how earnings are calculated.

Example 1:
The sequence lasts for 14 periods. A participants choice and the offers they draw are listed as follows:

Period	1	2	···	14
Minimum acceptable offer	243	-	···	-
Offer	675	-	···	-
Period Income	675	675	···	675

In Period 1, the offer of 675 is drawn and exceeds the chosen minimum acceptable offer, 243. Because this sequence lasts for 14 periods, the participants earning from the sequence is 675*14 = 9,450 points.

Example 2:
The sequence lasts for 31 periods. A participants choices and the offers they draw are listed as follows:

Period	1	2	3	4	5	6	7	···	31
Minimum acceptable offer	455	770	61	531	916	380	-	···	-
Offer	279	208	15	66	106	564	-	···	-
Period Income	0	0	0	0	0	564	564	···	564

In the first five periods none of the offers are accepted because they are less than the minimum acceptable offer. In Period 6, the offer of 564 is drawn and is accepted because it exceeds the minimum acceptable offer of 380. Because there are still 31-5=26 periods remaining in the sequence, the participants earning from the sequence is 564*(31-5) = 14,664 points.

Example 3:
The sequence lasts for 8 periods. A participants choices and the offers they draw are listed as follows:

Period	1	2	3	4	5	6	7	8
Minimum acceptable offer	655	818	138	927	700	322	877	427
Offer	525	51	67	823	659	285	525	225
Period Income	0	0	0	0	0	0	0	0

None of the offers are accepted because they are all less than the minimum acceptable offer. Therefore the participants earning from the sequence is 0 points.

The numbers in these examples have been chosen just for illustrative purposes. In the actual experiment, the computer will determine the number of periods in a sequence (using the rule that at the end of a period there is a 5% chance the sequence stops and a 95% chance the sequence continues). As long as you have not accepted an offer in the sequence, the computer will also draw the offer in each period (each offer from 1 to 1000 is equally likely).

[**Peer and Peer-Offer treatments only:** In each sequence, you will be randomly and anonymously paired with another participant. After the completion of each sequence, participants in the room will be randomly re-paired so the people you are paired with will change from sequence to sequence. In each sequence the person you are paired with is also choosing whether to accept offers. The offers you and that participant receive will be independent. This means you are equally likely to receive any offer from 1 to 1000, regardless of the other persons offer. When the computer determines whether to continue the sequence at the end of the period, it does this for both of you. That is, if the sequence continues, it continues for both of you and if it stops it stops for both of you.]

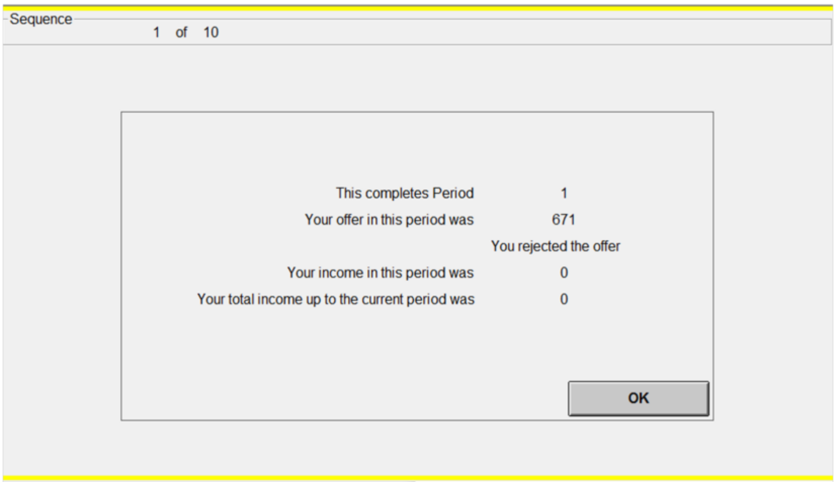
The minimum acceptable offer will be chosen by you in each period before an offer is accepted. [**Individual treatment only:** At the end of each period, you will observe your offer and whether it is accepted (unless you already accepted an earlier offer). At the end of every period, you will receive feedback on period income. You will also observe your total income up to the period.] [**Peer treatment only:** At the end of every period, both you and the other participant will receive feedback on period income of both you and that participant. Both of you will also be informed of any offers made in that period and whether they were accepted. You will also observe your total income from the sequence up to the period.] [**Peer-Offer treatment only:** At the end of every period, both you and the other participant will receive feedback on period income of both you and that participant. Both of you will also be informed of any offers made in that period and whether they were accepted. You will also observe your total income from the sequence up to the period.] The information will be displayed on the screen in the following layout:

[**Screenshots: Figure A1**]

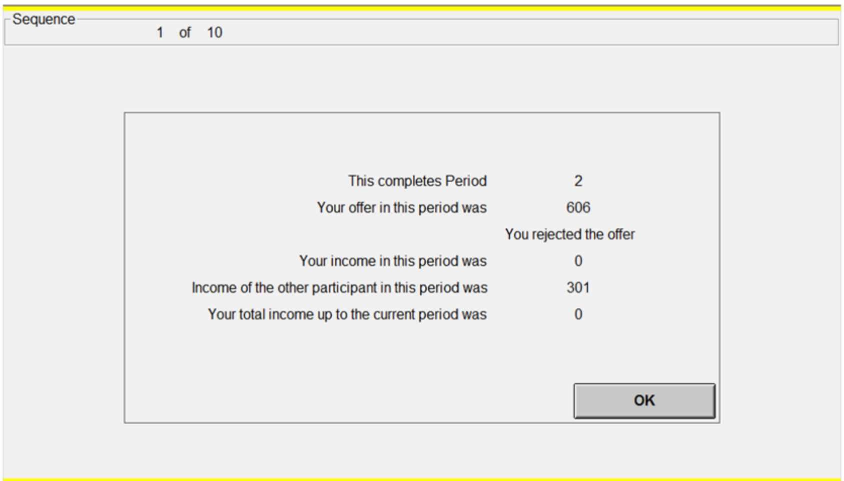
After the completion of each sequence, you will see the total number of periods, and your total income from all the periods in the sequence.

At the end of experiment, one of the 10 sequences will be drawn and the total points you earned in that sequence will be converted to cash as part of your payment.

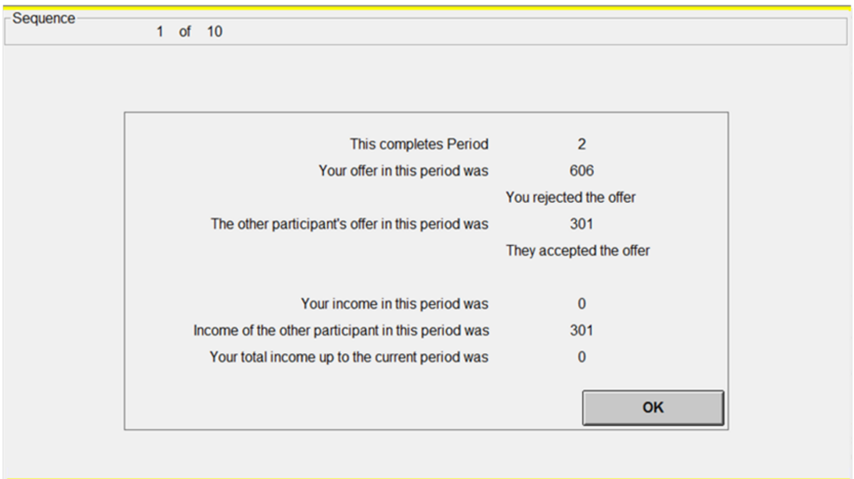
Before we begin the decision-making part of the experiment we will ask some questions to make sure you understand these instructions. Please look at you screen and follow the instructions. If at any time you have a question raise your hand and someone will come to your desk to answer it.



(a) Individual Treatment



(b) Peer Treatment



(c) Peer-Offer Treatment

Figure A1: Screenshots for period feedback

Control questions

[*] *indicates differences across treatments.*

1. What is the probability that the computer will offer you more than 500 in Period 1 of a round?
- Lower than 50%
- Exactly 50%
- Higher than 50%
(Message if a wrong answer is selected: "The answer you picked is incorrect; the offer is drawn from 1, 2 to 1000 with equal probability, so in each period the probability of getting an offer larger than 500 is exactly 50%.")

2. Suppose in the Period 1 you rejected an offer of 233. What is the probability that the computer will offer you more than 500 in Period 2?
- Lower than 50%
- Exactly 50%
- Higher than 50%
(Message if a wrong answer is selected: "The answer you picked is incorrect; the offers you get are independently drawn, so the probability of getting an offer larger than 500 in Period 2 is exactly 50%.")

3. Suppose you accepted an offer of 879 in Period 1, what is the probability that the round will continue to Period 2?
- Lower than 95%
- Exactly 95%
- Higher than 95%
(Message if a wrong answer is selected: "The answer you picked is incorrect; the probability the round will continue to Period 2 is exactly 95%. At the end of every period there is a 5% chance the round stops and a 95% chance the round continues.")

4. Suppose you rejected an offer of 435 in Period 10, what is the probability that the round will continue to Period 11?
- Lower than 95%
- Exactly 95%
- Higher than 95%
(Message if a wrong answer is selected: "The answer you picked is incorrect; after Period 10, the probability that the round will continue to Period 11 is exactly 95%. At the end of every period there is a 5% chance the round stops and a 95% chance the round continues.")

5. In periods 1-3, the minimum acceptable offer and received offers of a participant are listed in the following table:

Period	1	2	3	⋯
Minimum acceptable offer	891	850	620	⋯
Offer	383	777	643	⋯

The participant has accepted the offer in which period?
- Period 1
- Period 2
- Period 3
(Message if a wrong answer is selected: "The answer you picked is incorrect; the participant has accepted the offer in Period 3, which is the first period that the offer received exceeds the minimum acceptable offer.")

[**Peer and Peer-Offer treatments only:**
6. Suppose in Period 1 your offer is 698, what is the probability that your paired participants offer is larger than 500 in the same period?
- Lower than 50%
- Exactly 50%
- Higher than 50%
(Message if a wrong answer is selected: "The answer you picked is incorrect; the offers you and your paired participant get are independent, so for them the probability of getting a number larger than 500 is exactly 50%.")]

7. The experiment will consist of 10 sequences. After the completion of the experiment, how many sequence(s) will be drawn to determine the payoffs of the participants?
- Only one
- More than one
- The number of sequences is randomly determined by the computer
(Message if a wrong answer is selected: "The answer you picked is incorrect; only ONE out of 10 sequences will be drawn to determine the payoff of the participants. ")

Appendix B Theoretical Analysis

B.1 Basic setup

We describe a simple job-search model based on McCall (1970). An infinitely-lived job-seeker makes decisions and receives income over a sequence of discrete time periods.

While searching the job-seeker draws one wage offer w per period from a bounded wage distribution $F(w)$. Offers are independently drawn across periods. If the job-seeker rejects the offer their income is zero in that period and they continue search. If the job-seeker accepts the offer, they exit search and receive w for the current and all future periods. In the baseline case we assume that the period utility is

$$u_t = y_t, \text{ where } y_t = \begin{cases} w \text{ if offer } w \text{ has been drawn and accepted,} \\ 0 \text{ otherwise.} \end{cases}$$

We assume the job-seeker maximises the expected discounted sum of period utilities:

$$\sum_{t=0}^{\infty} \delta^t E[u_t], \quad 0 < \delta < 1$$

Since the environment is stationary, the optimal strategy can be expressed as a constant reservation wage r, i.e. in any period, the job-seeker accepts if offered at least the reservation wage, and continues to search otherwise. The job-seeker's objective function can be written as a function of the reservation wage, $V(r)$. With probability $F(r)$ the job-seeker rejects the offer, earns zero in the current period and faces an identical decision problem in the next period (and hence gets $\delta V(r)$). With probability $1 - F(r)$ the job-seeker accepts the offer and earns the offered amount in all future periods. Thus,

$$V(r) = F(r)(0 + \delta V(r)) + (1 - F(r)) \frac{1}{1-\delta} E[w|w \geq r],$$

which can be re-arranged as

$$V(r) = \frac{1}{(1 - \delta F(r))} \int_{w>r} \frac{w}{1-\delta} \, dF(w). \tag{1}$$

For a given offer distribution this can be used to solve the optimization problem directly. For ease of exposition, in the remainder of the discussion we assume that the wage offer follows a uniform distribution over $[0, 1]$, $F(w) = w$. Then (1) is maximized with a unique r over $[0, 1]$,

$$r^* = \frac{1 - \sqrt{1 - \delta^2}}{\delta}. \tag{2}$$

For a discount factor $\delta = 0.95$, this implies an optimal reservation wage of $r^* = 0.724$. For our experiment with wage offers following a discrete uniform distribution on $\{1, \cdots, 1000\}$, the optimal reservation wage is 725.

B.2 Distributional preferences

Now suppose that there are two job-seekers, indexed by $i \in \{1, 2\}$, who are "partners" in the sense that they perform the same sequential search task simultaneously, with wage offers being independent draws across job-seekers and periods. The job-seekers are informed of each other's income at the end of each period. We assume that the job-seekers make interpersonal comparisons in each period of search. Specifically, following Fehr & Schmidt (1999), we assume that i dislikes income differences, as represented by the period utility function (where y_{it} denotes i's period t income and y_{jt} denotes the period t income of i's partner)

$$u_{it}(y_{it}, y_{jt}) = y_{it} - \alpha\big(\max\{y_{it}, y_{jt}\} - y_{it}\big) - \beta\big(\max\{y_{it}, y_{jt}\} - y_{jt}\big) \tag{3}$$

The assumptions made in Fehr & Schmidt (1999) are that $0 \leq \beta \leq 1$ and $\alpha \geq \beta$. We retain the assumption that utility is evaluated each period, including the distaste for inequality, and i seeks to maximize

$$\sum_{t=0}^{\infty} \delta^t E[u_{it}], \quad 0 < \delta < 1 \tag{4}$$

This extends the individual choice problem of Section B.1 to a game.

Our solution concept is that of Markov Perfect Equilibrium. A Markov strategy for player i is $(r_{i0}, r_i(y))$, an initial reservation wage r_{i0} that governs i's acceptance decision when both partners are active job-seekers, and a reservation wage function $r_i(y)$ that governs i's acceptance decision when she is actively searching but the partner has already accepted an offer and obtains period income y. A Markov Perfect Equilibrium is a pair of Markov strategies $(r^*_{i0}, r^*_i(y))$, $i = 1, 2$, such that,

1. For each i, $r^*_i(y)$ maximizes (4) given partner j is inactive with period income y.
2. For each i, r^*_{i0} maximizes (4) given partner j is active using strategy $(r^*_{j0}, r^*_j(y))$, and i will revert to $r^*_i(y)$ if j exits with period income y.

We start by calculating $r^*_i(y)$ and then find r^*_{i0} using backward induction.

B.2.1 Optimal reservation wage for active job-seeker after partner exits

Consider the case that i is still searching and j has exited with a wage (and hence a per-period income) of $y_{jt} = y$. Again the dynamic problem facing i is stationary, and so the optimal reservation wage is constant.

Using a constant reservation wage r_i, i's expected discounted utility beginning from a period in which j is inactive with period income y is denoted by $V_A(r_i; y)$. With probability r_i the offer is rejected $(w < r_i)$, which gives the current period utility of $-\alpha y$ and a discounted future value of $\delta V_A(r_i; y)$, and with probability $1 - r_i$, the offer is accepted $(w \geq r_i)$, which yields a constant period utility in all future periods. Thus,

$$V_A(r_i; y) = r_i(u_i(0, y) + \delta V_A(r_i; y)) + (1 - r_i)\frac{1}{1-\delta}E[u_i(w, y)|w \geq r_i],$$

and rearranging gives

$$V_A(r_i; y) = \frac{1}{1 - \delta r_i}\left(r_i u_i(0, y) + \frac{1}{1-\delta}\int_{r_i}^{1} u_i(w, y)\ dw\right).$$

With u_i given by (3),

$$V_A(r_i; y) = \frac{1}{1 - \delta r_i}\left(-r_i\alpha y + \frac{1}{1-\delta}\left(\int_{r_i}^{k}(w - \alpha(y - w))\ dw + \int_{k}^{1}(w - \beta(w - y))\ dw\right)\right),$$

where $k \equiv \max\{r_i, y\}$.

This is maximized by $r_i^*(y)$,

$$r_i^*(y) = \max\left\{\frac{1 - \sqrt{1 - \delta^2 + 2\delta(1-\delta)\ \frac{\alpha+\beta}{1-\beta}y}}{\delta}, \frac{1 - \sqrt{1 - \delta^2 + \delta^2\ \frac{\alpha+\beta}{1+\alpha}(1-y)^2}}{\delta}\right\}. \quad (5)$$

Equation (5) describes the optimal reservation wage for a job-seeker (with given α, β and δ) after their partner has exited search with period income y. When $\alpha = \beta = 0$ this reduces to (2) and the reservation wage is independent of the partner's income. For other values of α, β, $0 < r_i^*(y) \leq r^*$. For $y = 0$ or 1 the optimal reservation wage is r^*. For $y < \hat{y}$, $r_i^*(y)$ is decreasing in y. For $y > \hat{y}$, $r_i^*(y)$ is increasing in y. This is illustrated by Figure B1 in which we plot $r_i^*(y)$ for five sets of (α, β) and $\delta = 0.95$.

We use $V_A(y)$ to denote the value of the game to i beginning from a period in which she is active but j has previously accepted an offer and receives period income y. That is,

$$V_A(y) = V_A(r_i^*(y); y). \quad (6)$$

B.2.2 Optimal initial reservation wage when both job-seekers are active

Now we move on to find the equilibrium initial reservation wage. Job-seeker i's expected discounted utility beginning from a period in which both job-seekers are active is a function of their initial reservation wages $V_0(r_{i0}, r_{j0})$. The period has four possible outcomes: neither of the job-seekers accept their offers, i accepts and j rejects, j accepts and i

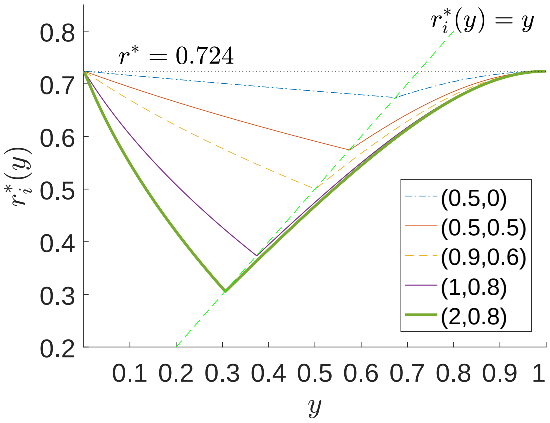


Figure B1: Optimal reservation wage for i after j exits with y: $r_i^*(y)$

Notes: (α, β) for each curve is given by the legend; $\delta = 0.95$; the horizontal dotted line indicates the earning maximizing $r^* = 0.724$; the dashed green line is $r_i^*(y) = y$, where the kink point of $r_i^*(y)$ (denoted by $\hat{y}$) lies.

rejects, or both of the job-seekers accept. Thus $V_0(r_{i0}, r_{j0})$ can be written as the sum of four components, each regarding the payoff from one of the outcomes:

$$\begin{aligned}
V_0(r_{i0}, r_{j0}) = & \int_0^{r_{j0}} \int_0^{r_{i0}} \big(0 + \delta V_0(r_{i0}, r_{j0})\big)\, dy_j dy_i \\
& + \int_0^{r_{j0}} \int_{r_{i0}}^1 \big(u_i(y_i, 0) + \delta V_I(y_i)\big)\, dy_i dy_j \\
& + \int_0^{r_{i0}} \int_{r_{j0}}^1 \big(u_i(0, y_j) + \delta V_A(y_j)\big)\, dy_j dy_i \\
& + \frac{1}{1-\delta} \int_{r_{i0}}^1 \int_{r_{j0}}^1 u_i(y_i, y_j)\, dy_j dy_i
\end{aligned}$$

When neither accepts, i receives current period utility of zero and in the next period begins a subgame which is identical to the original game. When i accepts and j rejects, i's current period utility is $u_i(y_i, 0)$, and we denote by $V_I(y_i)$ (subscript I for "inactive") the value of the game to i beginning from a period in which she is inactive with period income y_i and the partner is active. When i rejects and j accepts and earns period income y_j, i's current period utility is $u_i(0, y_j)$, and the value of the game to i from the beginning of the next period is $V_A(y_j)$. Finally, when both i and j accept their offers in the current period i gets utility $u_i(y_i, y_j)$ in this and every future period.

Rearranging and using (3) gives

$$
\begin{aligned}
V_0(r_{i0};r_{j0}) =& \frac{1}{1-\delta r_{i0}r_{j0}}\Bigg(r_{j0}\int_{r_{i0}}^{1}\big((1-\beta)y_i+\delta V_I(y_i)\big)\ dy_i + r_{i0}\int_{r_{j0}}^{1}\big(-\alpha y_j+\delta V_A(y_j)\big)dy_j \\
&+\frac{1}{1-\delta}\int_{r_{i0}}^{1}\int_{r_{j0}}^{1}\big(y_i-\alpha\big(\max\{y_i,y_j\}-y_i\big)-\beta\big(\max\{y_i,y_j\}-y_j\big)\big)\ dy_j dy_i\Bigg),
\end{aligned} \tag{7}
$$

Note that $V_I(y_i)$ depends on both player's preferences (and i's belief about j's preferences), so identifying the equilibrium initial reservation wage requires assumptions about both job-seekers' preferences and what players know about each other's preferences. For tractability, we assume players have identical preferences and this is common knowledge.

If i is inactive with period income y_i we assume j uses the optimal reservation wage $r_j^*(y_i)$. Then,

$$
V_I(y_i) = r_j^*(y_i)\big(u_i(y_i,0)+\delta V_I(y_i)\big) + (1-r_j^*(y_i))\frac{1}{1-\delta}E[u_i(y_i,w)|w\geq r_j^*(y_i)],
$$

which is rearranged as

$$
V_I(y_i) = \frac{1}{1-\delta r_j^*(y_i)}\left(r_j^*(y_i)u_i(y_i,0)+\frac{1}{1-\delta}\int_{r_j^*(y_i)} u_i(y_i,w)\ dw\right).
$$

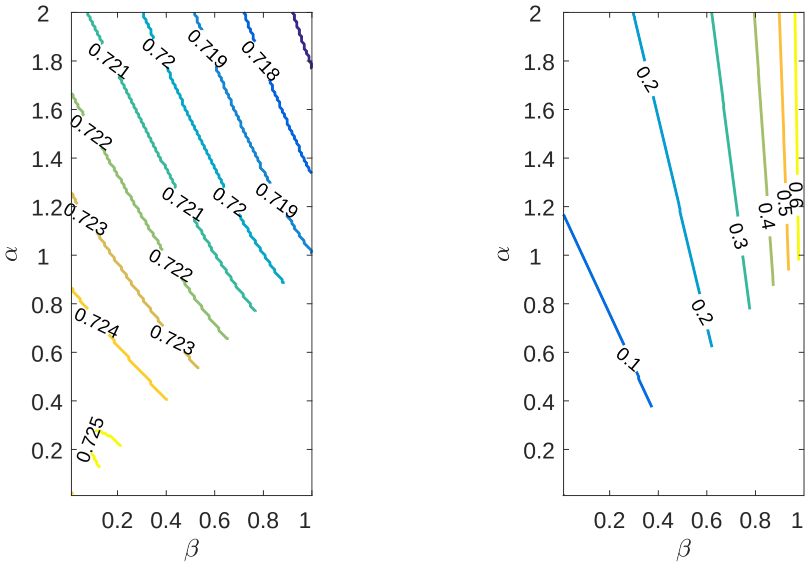
Given (3), it is convenient to denote $l\equiv\max\{r_i^*(y_i),y_i\}$, so we have

$$
\begin{aligned}
V_I(y_i) = & \frac{1}{1-\delta r_i^*(y_i)}\Bigg(r_i^*(y_i)(1-\beta)y_i \\
&+\frac{1}{1-\delta}\big((1-r_i^*(y_i))y_i-\alpha\int_{l}^{1}(w-y_i)dw-\beta\int_{r_i^*(y_i)}^{l}(y_i-w)dw\big)\Bigg).
\end{aligned} \tag{8}
$$

Combining (5), (6), (7) and (8), we complete the initial objective function V_0 for i. We conduct a calibration to find the optimal response function for i given j's choice, $r_{i0}^*(r_{j0})$. We calibrate r_{i0}^* for all (α,β), $\alpha\in[0,2)$, $\beta\in[0,1)$, and $\alpha>\beta$ with grid equal to 0.01. The results are accurate to the third decimal place.

The simulation shows that the equilibrium r_{i0}^* is close to the expected own-earning-maximizing r^*. For the majority of (α,β), r_0^* is slightly below r^*, although for small α and small β it is slightly above r^* (Figure B2a).

The initial equilibrium reservation wage r_{i0}^* lies above the kink point of the $r_i^*(y)$ function, $\hat{y}$. This implies that a player never accepts a wage below $\hat{y}$ (Figure B2b) and so in equilibrium only the positively-sloped part of $r_i^*(\cdot)$ is relevant in Figure B1.



(a) Initial equilibrium reservation wage r_0^*

(b) Comparison of r_0^* with kink-point: $r_0^* - \hat{y}$

Figure B2: Equilibrium initial reservation wage for different Fehr-Schmidt parameters

Notes: $\beta \in [0, 1)$, $\alpha \in [0, 2)$, $\alpha \geq \beta$; $r^* = 0.724$. The equilibrium r_{i0}^* lies between 0.717 and 0.726 for all (α, β). In the calibrated range of (α, β), r_{i0}^* takes its minimum at $(1.99, 0.91)$ and maximum at $(0.24, 0.06)$. $(r_{i0}^* - \hat{y})$ is always positive, and takes its minimum of 0.003 at $(0.01, 0.01)$ and maximum of 0.687 at $(1.99, 0.99)$.

B.2.3 Summary and implications

After a partner exits, the model predicts that the remaining job-seeker selects a constant reservation wage that depends on the partner's income (see Figure B1). Since the initial reservation wage lies above the kink point, only the upward sloping portion is relevant in equilibrium. Therefore the model predicts a positive relationship between the wage accepted by the partner and the reservation wage of the remaining job-seeker. In most cases, the change in reservation wage in response to partner's exit is negative, but the size of the change is moderated by the exit offer of the partner. Note that although we only report the calibration with standard Fehr-Schmidt assumptions, this qualitative prediction can be extended to negative β's, as long as $-\alpha < \beta$.

These results have three practical implications for job search outcomes. First, the probability that a job-seeker exits in period t depends positively on whether their partner exited in period $t-1$. In our setting, the probability of exiting is $1 - F(r) = 1 - r$, which changes from $(1 - r_0^*)$ before the partner exits to $(1 - r^*(y))$ after the partner exits with y. The expected change is $r_0^* - E[r^*(y)|y \geq r_0^*]$. Before the partner exits, the probability of exiting is about 28%, and the expected increase in the probability of exiting after partner exits varies from about 3% for high values of α and β to 1% for low values. The expected changes for five sets of (α, β) are reported in column (1) of Table B1.

Table B1: Quantifying the implications for search outcomes

	(1)	(2)	(3)
	Expected change in prob. of exiting when j exits:	Linearized relationship between. $r^*(y)$ and y, $y \geq r_0^*$:	Correlation between exit wages:
$(\alpha, \ \beta)$	$r_0^* - E[r(y)\vert y \geq r_0^*]$	$\frac{r^*(1)-r^*(r_0^*)}{1-r_0^*}$	$\rho(y_1, y_2)$[a]
(0, 0)	0.000	0.000	0.000
(0.5, 0.0)	0.013	0.132	0.046
(0.5, 0.5)	0.024	0.253	0.100
(0.9, 0.6)	0.027	0.297	0.110
(1.0, 0.8)	0.029	0.336	0.129
(2.0, 0.8)	0.028	0.349	0.130

[a] Based on calibration of 100,000 pairs.

Second, there is a "spillover" from the partner's exit wage to the remaining job-seeker's reservation wage. A job-seeker whose partner has exited with a high wage has a higher reservation wage than a job-seeker whose partner has exited with a low wage. Given an initial reservation wage of r_0^*, the exit wage varies uniformly between r_0^* and 1. The reservation wage of the active job-seeker then varies from $r^*(r_0^*)$ to $r^*(1)$. The difference between $r^*(1)$ and $r^*(r_0^*)$ varies from 0.10 for high α and β to 0.04 for low α and β. Column (2) of Table B1 reports the slope of the linearized relationship between the partner's exit wage and the remaining job-seeker's reservation wage, which shows that a unit increase in y leads to a linearized increase in r^* of 0.35 for high and 0.13 for low α and β.

Third, this implies a correlation of wages across partners. By definition, independent job-seekers' wages are uncorrelated. In contrast, inequity averse job-seekers who are partners will have positively correlated wages, if they exit in sequence. The correlation is 0.13 for high α and β and 0.05 for low α and β (column(3) of Table B1).

Appendix C Additional results

Table C2: Alternative specifications for Table 4

	(1) Isolated			(2) Partner			(3) Partner-Offer		
β_1 j accepted offer (a_j)	−11.443	−8.923	−16.231	−71.029**	−69.019*	−71.662**	−58.712***	−61.161***	−59.495***
	(11.988)	(13.411)	(12.675)	(33.712)	(38.390)	(35.521)	(17.223)	(16.297)	(19.022)
β_2 j's income ($a_j o_j$)	0.021	0.018	0.028	0.094**	0.088*	0.092*	0.083***	0.082***	0.083***
	(0.027)	(0.032)	(0.027)	(0.047)	(0.052)	(0.049)	(0.025)	(0.022)	(0.029)
β_3 value of j's offer (o_j)	0.004	0.003	0.003	−0.008	−0.001	−0.006	−0.002	−0.001	−0.002
	(0.016)	(0.019)	(0.016)	(0.022)	(0.022)	(0.023)	(0.012)	(0.011)	(0.012)
Subject random effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Period fixed effects	No	No	Yes	No	No	Yes	No	No	Yes
Sequence fixed effects	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Subject characteristics	No	No	Yes	No	No	Yes	No	No	Yes
Number of obs.	502	502	502	578	578	578	591	591	591
Number of sessions	6	6	6	6	6	6	6	6	6

Table C3: Estimates of the sequence trends

	Period 1 (r_{is1}) (1)	Period 1 (r_{is1}) (2)	Exit period (r_{isL}) (3)	Exit period (r_{isL}) (4)
Isolated	3.733	3.732	4.078***	4.083***
	(2.555)	(2.559)	(1.293)	(1.294)
Partner	9.538***	9.540***	12.926***	12.904***
	(1.883)	(1.886)	(2.235)	(2.239)
Partner-Offer	6.333**	6.328**	7.663***	7.659***
	(2.875)	(2.877)	(2.463)	(2.466)
p-values for				
Partner vs. Isolated	0.067	0.068	0.001	0.001
Partner-Offer vs. Isolated	0.499	0.500	0.197	0.199
Partner vs. Partner-Offer	0.351	0.350	0.113	0.115
Subject random effects	Yes	Yes	Yes	Yes
Subject characteristics	No	Yes	No	Yes
Number of obs.	2,155	2,155	2,035	2,035

Notes: The sequence trends for each treatment are estimated using the following model:
$r_{ist} = \beta_0 + \beta_1 \text{Partner}_i + \beta_2 \text{Partner-Offer}_i + \beta_3 s + \beta_4 s \times \text{Partner}_i + \beta_5 s \times \text{Partner-Offer}_i + \eta_i + \epsilon_{ist}$,
where t is period 1 or the last period. The sample for column (1) and (2) excludes 5 sequences in which the subject timed out for the initial period. The sample for column (3) and (4) excludes 135 censored sequences.