



PAR FAS REGIONE TOSCANA Linea di Azione 1.1.a.3

Ambito disciplinare:

Scienze e tecnologie gestionali e dell'organizzazione, scienze politiche, sociologia ed attività di studio interdisciplinare in campo sociale

Project title:

**Ambienti di
Lavoro Virtuali per la Rilevazione del
Benessere
Organizzativo**

Experimental design

“Observing others: how does risk perception affect our decision-making?”



ALBO PROJECT EXPERIMENTAL DESIGN

Title Observing others: how does risk perception affect our decision-making?

Background Risk perception have been typically investigated in the framework of decision-making under risk and uncertainty (von Neumann and Morgenstern, 1947) which is one of the three main branches of decision-making jointly with intertemporal choice (Samuelson, 1937) and social decision-making that deals with social instead of individual preference. Social preference also indicates the preference of a society or group of people. In this context, however, the term is referring to individual interest for other-regarding choices and indeed, representing a component of individual behaviour, social decision-making influences the individual utility function (Camerer and Fehr, 2006;Fehr and Gächter, 2000;Smith, 1962;1982). Previous studies in the area showed that people typically act *as if* they are self-interested in competitive contexts, whereas they are more other-regarding in strategic interactions (Camerer and Fehr, 2006;Fehr and Rockenbach, 2003;Smith, 1962;1982). Particularly, social decision-making plays a central role in strategic interactions in which it is important to achieve an agreement in order to attain a certain social or economic aim (Fehr and Gächter, 2000). At the same time, however, little is known about individual decision-making when people are able to observe others' choices. Specifically, little is known about the perception of risk in similar contexts.

Literature review The fact that people care about the welfare of others in addition to their own is supported by both economists and psychologists (Camerer, 2003;Fehr and Schmidt, 1999;van Lange, 1999). However, social preference has significant inter-individual differences and, indeed, some people care more than others about other individual's welfare. The effect of others' choices in individual decision-making seems to be particularly interesting because everyday people make their own decisions observing others' choices in their natural environment and, indeed, real life contexts are typically characterized by both risk and *social exposure* (Yechiam et al., 2008). Nevertheless, the study of the effect of the



social environment in decision-making is mainly limited to fields such as group settings (Ariely and Levav, 2000; Isenberg, 1986), social learning (Casey and Rozin, 1989; Galef, 1995; 1996; Laland, 1996; Reeb, 2000) social facilitation (Zajonc et al., 1970), or pro-social behaviour (i.e. charitable donation) and inequalities among individuals (Anderson and Putterman, 2006; Andreoni and Miller, 2002; Bolton and Ockenfels, 2000; Carpenter, 2007; Charness and Rabin, 2002; Fehr and Schmidt, 1999; Loewenstein et al., 1989; Metereau et al., n.d.; Rabin, 1993). Despite these studies on the effect of social environment, however, little is known about decision-making in context in which people make their own decisions with the possibility to observe others' behaviour.

A first step in this direction has been realized by Yechiam et al. (2008). The authors investigated the effect of social exposure by means of two different decision tasks. In the first task, subjects had to choose between two different decision problems. In both problems there was a choice between a safe and a risky option even if the risky choice was rare (5%), in one decision problem, and equiprobable (50%), in the other one. The effect of social exposure was therefore investigated by comparing an *exposure* condition—in which participants had the possibility to observe others' choices and outcomes, with a control condition (i.e. *non-exposure* condition) in which participants made their choices individually. The authors found that the proportion of risky choices increased in both tasks (rare and equiprobable losses). However, since the effect was higher for the rare than for the equiprobable loss, Yechiam et al. concluded that social exposure was moderated by the type of risk faced. In the second task, instead, the authors compared the effect generated by observing others' choices (*information observer* condition) versus the one generated by being observed by other people during the task (*information source* condition). In this case, however, the rare loss task was the only task investigated. Yechiam et al. found that increased risk taking was connected with the information observer condition only and indeed, during the information source condition, no social exposure effect has been found. In previous studies (Zajonc et al., 1970), this has been lead to risk aversion. Also, the presence of others has been found to generate phenomena such



as arousal or selection of dominant strategies (Ratner and Kahn, 2002; Zajonc, 1965; Zajonc et al., 1970). Moreover, Blank (1968) found higher levels of risk in the presence of others than in the presence of the experimenter. Please note that empirical findings in this area are not overwhelming and, indeed, even if increased risk taking has been found to be connected with the observation of others' choices in previous studies (Ariely and Levav, 2000; Blank, 1968), no effect of social exposure was also found (Clark and Willems, 1969). Moreover, the study of Yechiam and colleagues did not investigate different factors (i.e. lack of self-control, memory limitations, or situational factors) which could influence social exposure and should also be taken into account in a more naturalistic environment.

In the field of neuroscience, observation of others' action - rather than behaviour - has been analyzed. Nelissen et al. (2005) applied functional magnetic resonance imaging (fMRI) to non-humans. They found that observation of actions performed by others activated neurons in the frontal lobe, including the area of *mirror neurons* (F5). These areas correspond, in human, to area 44 and 45 and have been found to have a crucial role in speech. Moreover, Fenzl and Brudermann (2009) observed that others' behaviour affected risk perception and evaluation of risk in unfamiliar contexts and, also, that emotional processes such as *emotional contagion* could influence choice during decision-making.

Despite this preliminary findings, however, the decision-making in social exposure contexts remains only partially investigated both in neuroscience and economics. Particularly, situations in which specific features of risk perception are considered should be deeply investigated and a more naturalistic environment should be taken into account.

Aim The main aim of the current research project is to clarify the effect of risk perception during a social exposure task characterized by risky situations involving monetary and non-monetary gains and losses.

Subjects Graduate and undergraduate students (males and females) to recruit among first-year university courses in Economics or students who do not have prior knowledge of research and theory on risk perception.



Materials and Methods First of all, the experiment should be realized as a behavioural experiment. The behavioural experiment could also represent a pilot experiment for studying the same task by means of high-immersive virtual reality techniques and, also, functional magnetic resonance imaging (fMRI). The fMRI experiment could be also realized in conjunction with virtual reality depending on the techniques available (Hoffman et al., 2003). During the behavioural experiment, the subject chooses between two risk taking situation involving gains or losses. The subject is allowed to state its preference only after seeing the choice made by another subject for the same option. The *other* subject should be (1) risk averse or risk seeking and also (2) a male or a female during half of the experiment in order to verify the possibility of any gender/personality effect. Also, a control group face the same options of the experimental one without seeing other subjects, that is individually. The experiment could be presented with both monetary and non-monetary (i.e. job risk situation) risky gains and losses. The virtual experiment and the fMRI experiment should be organized on the basis of the behavioural experiment results. To this aim, in the behavioural experiment, it is important to give to the participants as much time they need to make their decisions. This will be particularly crucial for the temporal sequence of events during the fMRI experiment. Personality tests will be also provided.

Hypothesis Since little is known about the decision-making in similar contexts, it is not clear if risk perception would increase or decrease as a consequence of observing others' choices. However, based on literature previously cited, observing others' choices seems to affect risk perception increasing levels of acceptable risk and reducing risk aversion (Yechiam et al., 2008). It remains an open question if this could depend on an increase in the level of rationality of the participant as a direct consequence of others' choices.

Costs The costs are mainly due to participants rewards. The cost of high-immersive virtual reality techniques should be also considered if these techniques are not available and should be acquired.



Ethics If the fMRI will be realized in the US, the project should be evaluated by an ethic commission before realization; otherwise (and for the behavioural task) we only need the informed consent as standard practice.

References

Anderson C. M., Putterman L., 2006, "Do non-strategic sanctions obey the law of demand? The demand for punishment in the voluntary contribution mechanism", *Games and Economic Behavior*, 54, pp. 1-24.

Andreoni J., Miller J., 2002, "Giving according to GARP: an experimental test of the consistency of preferences for altruism", *Econometrica*, 70, pp. 737-753.

Ariely D., Levav J., 2000, "Sequential choice in group settings: Taking the road less traveled and less enjoyed", *Journal of Consumer Research*, 27, pp. 279-290.

Blank A., 1968, "Effects of group and individual conditions on choice behavior", *Journal of Personality and Social Psychology*, 8, pp. 294-298.

Bolton G. E., Ockenfels A., 2000, "ERC: a theory of equity, reciprocity and competition", *Am Econ Rev*, 90, pp. 166-193.

Camerer C., 2003, *Behavioral game theory - Experiments in strategic interaction*, NJ: Princeton University Press.

Camerer C. F., Fehr E., 2006, "When does "economic man" dominate social behavior?" *Science*, 311:5757, pp. 47-52.

Carpenter J., 2007, "The demand for punishment", *J Econ Behav Org*, 62, pp. 522-542.



Casey R., Rozin P., 1989, "Changing children's food preferences: Parent opinions", *Appetite*, 12, pp. 171–182.

Charness G., Rabin M., 2002, "Understanding social preferences with simple tests", *Quarterly Journal of Economics*, 117, pp. 817-869.

Clark R. D. I., Willems E. P., 1969, "Where is the risky shift? Dependence on instructions", *Journal of Personality and Social Psychology*, 13, pp. 215–221.

Fehr E., Gächter S., 2000, "Fairness and retaliation: the economics of reciprocity", *J Econ Persp*, 14, pp. 159-181.

Fehr E., Rockenbach B., 2003, "Detrimental effects of sanctions on human altruism", *Nature*, 422:6928, pp. 137-140.

Fehr E., Schmidt K. M., 1999, "A theory of fairness, competition, and cooperation", *Quarterly Journal of Economics*, 114, pp. 159-181.

Fenzl T., Brudermann T., 2009, "Risk behavior in decision-making in a multi-person-setting", *The Journal of Socio-Economics*, 38, pp. 752–756.

Galef B. G. J., 1995, "Why behavior patterns that animals learn socially are locally adaptive", *Animal Behavior*, 49, pp. 1325–1334.

Galef B. G. J., 1996, "The adaptive value of social learning: A reply to Laland", *Animal Behavior*, 52, pp. 641–644.



Hoffman H. G., Richards T., Coda B., Richards A., Sharar S. R., 2003, "The illusion of presence in immersive virtual reality during an fMRI brain scan." *CyberPsychology & Behavior*, 6:2, pp. 127-131.

Isenberg D. J., 1986, "Group polarization: A critical review and meta analysis", *Journal of Personality and Social Psychology*, 50, pp. 1141–1151.

Laland K. N., 1996, "Is social learning always locally adaptive?" *Animal Behavior*, 52, pp. 637–640.

Loewenstein G., Thompson L., Bazerman M. H., 1989, "Social utility and decision-making in interpersonal contexts", *J Personal Soc Psychol*, 57, pp. 426-441.

Metereau E., Butera L., Villeval M. C., Dreher J. C., n.d., "Audience effect on two types of pro-social behavior: an fMRI Investigation", *unpublished version*.

Nelissen K., Luppino G., Vanduffel W., Rizzolatti G., Orban G. A., 2005, "Observing Others: Multiple Action Representation in the Frontal Lobe", *Science*, 310:5746, pp. 332-336.

Rabin M., 1993, "Incorporating fairness into game theory and economics", *Am Econ Rev*, 83, pp. 1281-1302.

Ratner R. K., Kahn B. E., 2002, "The impact of private versus public consumption on variety-seeking Behavior", *Journal of Consumer Research*, 29, pp. 246–257.



Reebs S. G., 2000, "Can a minority of informed leaders determine the foraging movements of fish shoals?" *Animal Behavior*, 59, pp. 403–409.

Samuelson P. A., 1937, "A note on measurement of utility", *Review of Economic Studies*, 4:2, pp. 155-161.

Smith V. L., 1962, "An experimental study of competitive market behavior", *J Political Econ*, 70, pp. 111-137.

Smith V. L., 1982, "Microeconomic systems as an experimental science", *Am Econ Rev*, 72, pp. 923-955.

van Lange P. A. M., 1999, "The pursuit of joint outcomes and equality in outcomes: an integrative model of social value orientation", *J Pers Soc Psychol*, 77, pp. 337-349.

von Neumann J., Morgenstern O., 1947, *Theory of games and economic behavior*, NJ: Princeton University Press.

Yechiam E., Druryan M., Ert E., 2008, "Observing others' behavior and risk taking in decisions from experience", *Judgment and Decision Making*, 3:7, pp. 493–500.

Zajonc R. B., 1965, "Social facilitation", *Science*, 149, pp. 269-274.

Zajonc R. B., Wolosin R. J., Wolosin M. A., Loh W. D., 1970, "Social facilitation and imitation in group risk-taking", *Journal of Experimental Social Psychology*, 6, pp. 26–46.

Ambienti di
Lavoro Virtuali per la Rilevazione del
Benessere
Organizzativo