Communication-by-Action and Market Design

Additional Funding Research Priority Areas 2014

Research Priority Area Behavioral Economics
1. Summary Research Priority Area
The Research Priority Area Behavioral Economics (RPA-BE) is at the forefront of improving understanding of economic behaviour and decision making, with effective applications in governance, institutional arrangements, and policy. By integrating developments in and insights offered by adjacent disciplines such as psychology, sociology, and biology, it has already advanced critical insights into, e.g., how to design effective auctions, the importance of other-regarding preferences and social ties, the ironic and sometimes adverse effects of institutional arrangements and sanction systems, and the conditions under which coordination and cooperation break down and conflict emerges.

Relying on a delicate mix of tight (field)experimental research and sophisticated game-theoretic modelling, the RPA-BE hosts a critical mass of internationally renowned scientists (CREED, CeNDEF, Markets & Organization, Human Capital: PI’s Gneezy, Hommes, Offerman, Oosterbeek, Plug, Schram, Sloof, Sonnemans, van Veelen), and has established itself as a key player internationally in advancing insights into economic behavior, in integrating its core business with adjacent disciplines located at the UvA (e.g., Psychology; Law; Biology), and in developing and expanding networks of internationally renowned scientists and their laboratories (e.g., Max Planck Institute for Collective Goods; UZH-Zurich; GATE Lyon; UAB Barcelona; CESS NYU; Rady School UCSD). Graduates of the RPA-BE have taken on leadership positions in academic research (e.g., Prof Jacob Goeree, director ESEI center for Market Design, president of the Economic Science Association, UZH Zurich), as well as in private businesses and public policy/governance (e.g., Adrian de Groot Ruiz, Director True Price Foundation).

Better understanding of how market design, usually through incentives, interacts with communication could help solve major problems. For example, the seminal work of Al Roth (2012 Nobel Prize and honorary doctorate at the UvA ) on matching revolutionized the way kidney transplants are handled in the United States, increasing the number of transplants. A key element in the new market design was creating efficient incentives that provide a mechanism for information exchange by actions. This example demonstrates that understanding how players in the market interact, and what their actions communicate to other players is often an alternative to costly systems of governance (e.g., sanctions, law enforcement). Communication is also key in many forms of economic trade and complex (multi-issue) negotiations within and between groups, communities, and organizations.

Accordingly, and to further innovate the economic sciences, RPA-BE targets communication as a core modulator of market design, and its applications to economic decision making, trade, and dispute resolution. We set two interrelated goals: (i) to reach out to, and integrate existing insight and expertise from adjacent disciplines (Psychological, Political, or Communication Sciences) that have much to say about various aspects of communication, and (ii) to construct a state-of-the-art laboratory fitted to study the modulating role of communication (e.g., coordination; tacit cues; implicit emotional signals; promises and threats; explicit verbal exchange of information). This communication and market design lab will allow us to study individual and (inter)group decision making settings that mimic and model economic systems such as work organizations or public institutions, creating a unique position for the UvA within the field of Behavioral Economics, promote the interdisciplinary outlook and impact of the RPA-BE, and as such be pivotal in making a significant contribution to both BE and adjacent disciplines.

2. Administrative data, embedding in department
The RPA-BE is located in the Faculty of Economics and Business, and spans four core groups (CREED, CeNDEF, Markets & Organization, Human Capital). Three of these were the highest ranked groups at the most recent ‘Onderzoeksvisitatie’. Table 1 shows that they are among the top programs in the Netherlands, with strong interactions between the groups (i.e., the number of co-authorships across groups surpasses the number of co-authorships within groups).

RPA-BE is coordinated by a 5-person board (Chair: Theo Offerman). The core activity of RPA-BE is the coordination of large scale experimental research in the CREED laboratories. Over the years we have witnessed a steady increase in the demand for the CREED laboratories, and currently the facilities are overbooked for substantial parts of the year, mainly because many disciplines within economics have recognized and adopted the method. Main activities further include the bi-monthly seminar series and the yearly Amsterdam Behavioral Experimental Economics Symposium held at the KNAW. Every year, we have a new RPA-BE visiting guest professor who interacts in research and provides a series of guest lectures. This year the position was awarded to Prof Sobel (UCSD, co-editor of Econometrica, the top journal in economics).

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1 By “communication-by-action,” we mean that people can often express their intentions by means of the actions they take, rather than by words. See later for some other examples of this.
RPA-BE has 25 members (15 research fte), 12 of whom are full professor and serving as PI, 7 are associate/assistant professor and serving as project leaders. RPA-BE currently hosts 24 PhD students (29% funded by GS2/3) and 6 post-docs (67% funded by GS2/3). Table 2 gives the PIs most relevant to this proposal, together with the advisory board who all are actively involved in the research of RPA-BE (see Appendix 1 for a full list of all members). Building off two NWO-PIONIER grants (for Cars Hommes of CeNDEF and Arthur Schram of CREED) it was further developed with four large (FP6) EU grants (for Frans van Winden and Cars Hommes) and an NWO-VICI grant (for Jacob Goeree). In recent years, we continued to be successful with two NWO-VIDI, three NWO-VENI grants and a large NWO-program ‘Evolution and Behavior’. In addition, RPA-BE receives an annual 250 K€ from the Department of Economics. These funds currently cover (i) costs of experiments (130 K€); (ii) visiting scientists and an annual ABEE symposium (35 K€ per year), and (iii) post-doc positions for talented scientists preparing for VVV/ERC grant applications (100 K€). In addition, the Department allocated funds (50 K€) to engage more structurally internationally renowned top-scientists. Recently, Uri Gneezy (named by Forbes among the top-10 most influential behavioral economists worldwide) has been hired as Professor of Behavioral Interventions at our department (0.2 fte). We think that this is a very credible signal that our department remains dedicated to supporting our RPA-BE and that our future looks bright.

Table 1: RPA-BE research groups and VSNU/QANU assessment (2009; range 1-5)

<table>
<thead>
<tr>
<th>Research group</th>
<th>quality</th>
<th>productivity</th>
<th>Relevance</th>
<th>viability</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREED: Experimental and Political Economics</td>
<td>5.0</td>
<td>4.5</td>
<td>5.0</td>
<td>4.5</td>
</tr>
<tr>
<td>CeNDEF: Equilibrium, Economics and Dynamics</td>
<td>4.5</td>
<td>4.5</td>
<td>5.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Markets and Organization (Industrial Economics)</td>
<td>5.0</td>
<td>4.5</td>
<td>5.0</td>
<td>4.5</td>
</tr>
<tr>
<td>Human capital</td>
<td>4.5</td>
<td>4.0</td>
<td>5.0</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Table 2: Principal Investigators and Advisory Board

<table>
<thead>
<tr>
<th>Most important PI’s</th>
<th>Research / Methods</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. dr. U. Gneezy</td>
<td>communication; communication-by-action; market design</td>
<td>economics (+psychology)</td>
</tr>
<tr>
<td>Prof. dr. C. Hommes</td>
<td>communication in large markets (macro applications)</td>
<td>lab experiments, behavioral theory economics</td>
</tr>
<tr>
<td>Prof. dr. T. Offerman</td>
<td>communication; communication-by-action; market design</td>
<td>lab experiments, game theory economics</td>
</tr>
<tr>
<td>Prof. dr. H. Oosterbeek</td>
<td>market design and the economics of education</td>
<td>field experiments, econometrics economics</td>
</tr>
<tr>
<td>Prof. dr. E. Plug</td>
<td>economics of education</td>
<td>field experiments, econometrics economics</td>
</tr>
<tr>
<td>Prof. dr. A. Schram</td>
<td>information transmission on networks; voting</td>
<td>lab experiments, econometrics economics</td>
</tr>
<tr>
<td>Prof. dr. R. Sloof</td>
<td>communication; communication-by-action; market design</td>
<td>lab experiments, game theory economics</td>
</tr>
<tr>
<td>Prof. dr. J. Sonnemans</td>
<td>Information processing; market design</td>
<td>lab experiments economics (+psychology)</td>
</tr>
<tr>
<td>Prof. dr. M. van Veelen</td>
<td>communication-by-action; population dynamics</td>
<td>evolutionary game theory economics (+biology)</td>
</tr>
<tr>
<td>Advisory board</td>
<td>Research / Methods</td>
<td>Field</td>
</tr>
<tr>
<td>Prof. dr. C. De Dreu, UvA</td>
<td>(information processing and exchange in) Cooperative Decision Making; Group Decision Making; Intergroup Conflict communication-by-action</td>
<td>Lab and field Experiments; Meta-analysis lab experiments, game theory Economics</td>
</tr>
<tr>
<td>Prof. dr. A. Schotter, CESS-NYU</td>
<td>Communications; communication-by-action</td>
<td>Game theory game theory Economics</td>
</tr>
<tr>
<td>Prof. dr. J. Sobel, UCSD</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Although RPA-BE is located within FEB, we note it increasingly bridges to renowned scientists working in adjacent disciplines such as Psychology, Law, Biology and Political Science, both within the UvA and elsewhere. Particularly relevant to the current focus on communication and market design are ongoing collaborations with (1) the conflict and...
creativity lab directed by De Dreu (Psychology Research Institute; RPA Brain and Cognition), an expert on group decision making, complex negotiation, and human cooperation; (2) the Amsterdam Center for Law and Economics, directed by Dari-Mattiacci, Faculty of Law; (3) the Institute for Biodiversity and Ecosystem Dynamics (IBED) through the group of Sabelis and (4) the political science group at Florida State University, led by former RPA-BE graduate Grosser.

3. Academic cases
There are a series of important questions on the interplay of communication and market design that will shape the future of the research agenda of RPA-BE. An important theme concerns the extent to which institutions are needed to complement the possibilities offered in communication processes. In many circumstances free communication between actors facilitates beneficial outcomes for society. In social dilemmas and coordination games, psychological factors like shame and guilt may enhance the credibility of promises and threats. At the same time, game theory predicts that there are clear limits to the extent to which communication will be self-signaling. In particular very little is known about the effectiveness of communication in large groups. In such circumstances, communication processes may need to be backed up by formal institutions. For instance, matching market institutions may substantially enhance societal outcomes when free communication fails.

In other circumstances, communication between the relevant actors is potentially harmful to society. Examples include the possibility (i) that firms agree to charge high prices at the detriment of consumers; (ii) that lobbyists bribe politicians to take actions that favor a small group at the expense of the silent majority; or (iii) that companies bidding for licenses in the telecom market collude to avoid paying high entry fees. In each of these cases, it is imperative to know the harm done by free-form communication and the effectiveness of institutions designed to counter the costs to society. Accordingly, we will also investigate the effectiveness of communication in political science applications. How will teams compete when they can internally communicate, or how does a leader communicate in a team if she has the possibility to exclude some of the members from participating in the communication? And what reputational consequences does leader communication and coalition formation have? How do complex negotiations proceed when emotion signaling and tacit maneuvering within and between groups is enabled or turned off, and what communication channels work well in group decision making where communication cannot be face-to-face (as in Command-and-Control teams during military operations)? It is these and related questions that RPA-BE needs to address, to advance scientific understanding but also to provide calibrated and evidence-based advice for policy, institutional design, and governance. Accordingly, we aim to set up the communication and market design laboratory that will be fully equipped to study communication and institutions in large groups. This requires a lab with a large number of computers (20) that are connected on a local network, and in which subjects are seated in soundproof cubicles equipped with cameras and microphones. The communication lab will further consist of an observation room and a conference room (with cameras and microphones), with a one-way mirror in between these rooms.\(^2\)

To promote fruitful integration between neuroscientific (e.g., fMRI, TDCs, neurohormonal modulation) and (social) psychological insights into communication processes on the one hand, and behavioral economics on the other, a small part of the funding will be used to add De Dreu (Psychology UvA) as part-time PI. De Dreu is an expert on the neurobiological and social psychological underpinnings of communication processes (i.e., emotion signaling, tactical maneuvering, and information exchange and processing) in bargaining, dispute resolution, and cooperative group decision making (e.g., J Pers Soc Psych, 2000, 2004, 2006, 2010; Pers Soc Psych Rev, 2008; Science 2010; PNAS 2011-a, 2011-b, 2014; Psychol Bull, 2014). His work and expertise nicely complements various lines of research on communication-in-action within RPA-BE, some of has already been very influential. Gneezy and colleagues (e.g., Science, 2010, 2014 (R&R); PNAS 2011, 2012, 2013, 2014; Mngmt Sci 2014; J Marketing Res, 2014) study the importance of signaling on economic decisions. The overarching conclusion from this research is that the way markets are designed influence the effectiveness of signaling—which is a key element in understanding communication. For example, in a field experiment involving hundreds of thousands of observations from a Disney theme park, it was shown that by changing the traditional pricing scheme to a “pay-what-you-want” one a company communicates to its customers that it trusts them: The action of letting customers decide about the price serves as a signal of trust. This communication by action is important because simply telling customers “we trust you” is not credible. As the results show, customers reward such signals of trust when paying for the product.

\(^2\) Some FMG laboratories are also equipped with such features but are too small to investigate communication in or between (large) groups. For some more specialized applications we can make use of those labs (e.g., eyetrackers can be used to track social preferences and the effectiveness of social and emotion signaling).
Offerman and colleagues have studied the effectiveness of communication-by-action versus communication-by-words in a series of studies (e.g., GEB, 2011; Exp Econ, 2014; J of Law, Econ Org forthcoming; Mngmt Sci R&R; IER R&R). The main finding is that people primarily effectively communicate by words and that senders only start using costly messages when their private information is so extreme that it can no longer be credibly communicated in words. In another line of research, Offerman and colleagues investigate institutions that allow sellers to fight collusion in auctions (e.g., JET, 2011, IJIO, 2011; Exp Econ, 2013). Recently, Offerman and colleagues have started to investigate the extent to which people can distill information from minimal cues. In a simple bargaining game, they find that people have the skills of detecting an “angry button” in others from a photo. A substantial proportion of 71% of the responders is accurately predicted to (not) reject an unfair offer, well above the 50% chance rate. The precise mechanisms that allow people to do so, and the extent to which the ability to predict behavior from minimal cues generalizes to other games and cultures, will be the subject of future research.

Schram and his co-authors have studied the importance of information transmission between individuals. One set of studies (Eur Econ Rev 2010, J Econ Behav Org 2010 and Soc Networks 2013) involves information exchange within employer networks during recruitment decisions. An important conclusion is that the efficiency of recruiting is enhanced when some employers bypass the market and use their networks to communicate information about prospective workers’ trustworthiness. A second set addresses the effects on the voter turnout decision of information about voting behavior by one’s neighbors (Am Pol Sci Rev 2006) or the party preferences of the electorate (Am J Pol Sci 2010). Such information has large effects on turnout rates in elections, especially when communicated directly by one’s peers.

Hommes and colleagues (e.g., AEJ:Micro 2012; EER 2013; Rev. Fin. Stud. 2005; JEDC 2012, 2011, 2009; JEO 2013, J.Evol.Ec. 2012) study how the aggregate behavior in macro experiments depends on the interactions of individual decisions and the market feedback structure. The main conclusion is that in positive feedback macro systems—where more optimistic expectations lead to higher prices say—the market does not settle down to the rational expectations equilibrium but rather fluctuates persistently around it. An important topic for future work is how communication and market design can mitigate instability and enforce convergence in macro systems. This is particularly important in the current discussions about transparency and forward guidance in monetary and fiscal policies that can enhance macro-financial stability.

4. Talent casus: Potential Brain Gain
The appeal to external researchers is evidenced by the number of requests that are received for sabbatical visits, for example. In addition to the yearly RPA-BE visiting guest professor, several prominent researchers pay us regular short visits (such as Prof. Charness). In addition, the group has organized multiple workshops and seminars where leading scholars in the field have presented their work. We will also continue to host events that will increase our visibility to the international community, such as our yearly workshop to which we invite the best researchers in Behavioral Economics. This year, the workshop’s theme is closely connected to our ambitions with regard to the additional funding, and a number of distinguished speakers from different fields (economics, psychology, and biology) will present their work (see http://www.creedexperiment.nl/abee/index.html).

The potential to attract new talent is boosted by recent developments. While the RPA-BE is renowned for linking theory (agent based modeling, (evolutionary) game-theory, and econometrics) to experimental research, these experiments traditionally exclusively focused on behavioral choice and decision making only. Fruitful pilot projects with Amsterdam Brain and Cognition (i.e., De Dreu, Ridderinkhof) has added the use of neuro-imaging and neurohormonal modulations. This combination of facilities and expertise makes for an excellent environment where researchers feel very comfortable. Already we see increased collaborations with top institutes across Europe (e.g., Lyon, Bonn, Toulouse) and beyond (e.g., New York, Hebrew U.).

To solidify these positive developments, and to further strengthen the international outlook and reputation of the RPA-BE, we allocate part of the funding to recruit a top-end researcher on communication in economics applications. To be able to attract a very good researcher, we will allow this person to build a small group consisting of four PhD subjects.

5. Innovation casus
The new communication lab will put RPA-BE in a unique position to study how market design, and in particular how incentives in such markets influence the interpretation of signals, including emotion cues, reputation building, pricing, and competition, as well as more direct information exchange. As we are interested in analyzing situations where (groups of) people interact strategically, we need a large lab. Existing large labs, like our current lab, are typically equipped with open cubicles, and not suited to study different types of communication in a controlled way. Labs that
are equipped with soundproof cubicles tend to be small and do not allow for experiments in which groups of people interact strategically with each other. Moreover, since communication can be very rich, the sample sizes should be fairly large, and with a small lab this imposes prohibitively high costs in terms of research time to collect data. Thus, our proposed program is innovative in that it enables:

- The study of communication-by-action within and between larger groups of people that are interacting strategically;
- Understanding the impact of (non)verbal communication channels (incl. image, sound, and options to exchange text or video messages);
- Creating studies that have reasonable sample sizes of participants that are needed to study communication,
- Specific testing of existing theories of communication and developing and improving novel theoretical models.

6. Valorisation casus

Researchers in this group have a long history of collaboration with societal organizations. The importance of behavioral research in studying markets has been recognized by the Dutch Central Bank (DNB) in joint research projects with RPA-BE’s PIs. SenterNovem has funded the study of behaviorally the effects of decentralized electricity generation by households, the Dutch government continues to consult us on behavioral aspects of auctions for spectrum rights, and members of the RPA-BE regularly engage with industry (e.g., Disney, HP, and Humana) on incentives and market design.

Our research on the effects of communication-by-action will be of great societal relevance. In Dutch culture, politicians, employer’s organisations and employee’s organisations spend a lot of effort seeking beneficial agreements through communication. Our research will contribute to the understanding of the factors that actually make communication work. How should the incentives in the market be designed? How much credibility should be assigned to promises? Is it possible to distinguish types? How important is it to decrease social distance? Knowledge of the combined effects of these factors is essential for improving the effectiveness of communication processes.

7. Expected Output

The major improvement of the additional funding will be in terms of the quality of our research. As we argued above, we believe that our group is in a unique position to take the next big step in behavioral economics and lead the research on communication-by-action. The facilities of our current lab do not allow us to systematically study how these factors affect human behavior and market outcomes. With the creation of a communication and market design laboratory, we will be able to systematically study communication and market design in large groups. The laboratory we envisage will be unique worldwide, allow us to push scientific frontiers and, accordingly, attract top researchers in our field for shorter visits, jobs, and joint research programs. We expect (i) more visible and influential research,(ii) stronger acquisition capacity (i.e., more GS2-4 income), and (iii) an increase in the flow of PhDs from 8 completed PhDs per year now to 12 - 14 PhDs per year.

The construction of our new communication lab is estimated to cost 254 K€ (this estimate is based on the costs for the construction of the previous lab); computers and audiovisual equipment will cost 25K€. There will be yearly costs (35 K€) like maintenance of the lab and internal price for the space (60m²). To effectively bridge RPA-BE to adjacent disciplines and expertise we aim to engage De Dreu (UvA-Psy; 0.2fte). Remaining funds will be used to attract a top scientist (the Department of Economics matches this with 4 PhD students that the top researcher can hire, and guarantees funding beyond four years, if necessary).

<table>
<thead>
<tr>
<th>Personnel</th>
<th>Fte</th>
<th>Nr. months</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>CKW De Dreu</td>
<td>0.2</td>
<td>48</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>140</td>
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<tr>
<td>Top researcher</td>
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<td>48</td>
<td>158</td>
<td>160</td>
<td>162</td>
<td>165</td>
<td>645</td>
</tr>
<tr>
<td>Non-personnel:</td>
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<td>communication lab</td>
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<td>314</td>
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<tr>
<td>Total</td>
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Table 3: Budget