

Variability in advice taking in decision making

Miho Kitamura (kitamura.miho@aoni.waseda.jp)

Waseda University,
3-4-1 Okubo, Shinjuku-ku, Tokyo 169-8555, Japan

Katsumi Watanabe (katz@waseda.jp)

Waseda University,
3-4-1 Okubo, Shinjuku-ku, Tokyo 169-8555, Japan

Abstract

We investigated how people would change and vary in accepting advice when the effectiveness of advice was unclear. In each trial, participants estimated a monthly rent of an apartment room based on the attribute list. Then, another estimate by a real-estate agent was given as advice. Participants made a final estimation, either by taking the advice fully, partially, or rejecting it totally. They repeated 48 estimations without feedback. The weight of advice index, representing how much each participant weighed a given advice, gradually decreased as the number of trials increased. Interestingly, the gradual reduction of acceptance was not observed in participants with high empathy and low depressive scores; they kept accepting advice even when the effectiveness of advice was unclear. These results suggest that the willingness of accepting and using advice depends on history of advice taking, the individual traits, and mood.

Keywords: decision making; advice taking; individual difference

Introduction

When we cannot make a decision by ourselves, we frequently ask for advice. Assume you are about to purchase a house and have two candidate options. Both houses are similarly attractive but different in various aspects. You cannot decide which to buy. Here comes a friend and starts giving you a series of advice. Will you accept advice and, if so, how much will you use the advice for your final decision? Obviously, it depends. Generally, we do not know if advice is useful or not until the outcome of a decision comes out. However, under ambiguous situations with time constraints, we often need to decide whether we should accept advice. In the present study, we examined how people would change and vary in accepting advice when the effectiveness of advice is unclear. In particular, we were interested in whether advice taking would depend on history of experience of advice taking and individual traits and mood.

In general, people heed advice and adjust their estimate and/or judgment (Bonaccio & Dalal, 2006; Yaniv, 2004b). However, this advice taking process is prone to various cognitive bias. For example, people tend to weight own judgment more even when they should take advice to improve their judgments (Yaniv, 2004a; Yaniv & Kleinberger, 2000). One of the biasing factors is a

characteristic of advisor. For example, people follow advice more when their advisor is labeled as an expert by the experimenter (e.g., Meshi et al., 2001; Harvey & Fischer, 1997), and when an advisor expresses great confidence in his/her advice (e.g., Sniezek & van Swol, 2001).

Although the previous studies mainly focused on the characteristics of advisor, several studies showed that, the internal states of decision makers (e.g., emotion and confidence) also modulate advice taking behaviors (Cooper, 1991; Gino & Schweitzer, 2008; Gino, Brooks, & Schweitzer, 2012). For example, when anxiety is experimentally induced in participants, they show lower confidence and consequently a higher level of acceptance of advice (Gino et al., 2012). These previous findings suggest that there may be individual differences regarding advice taking. However, it is not clear how individual characteristics (i.e., emotion, personality, and interpersonal reactivity) would influence advice taking. Using three questionnaires of personality, emotion, and interpersonal reactivity, we examined individual variability of advice taking behaviors.

One of major motivation for acceptance of advice is to adjust and improve own judgments. Therefore, if the effectiveness of advice is unclear, the acceptance of advice will decrease over time. In the present study, we confirmed this tendency and then examined how the reduction of advice taking would vary across individuals.

Method

Participants

Fifty-four university students participated in the present study (18 females and 36 males). They gave written informed consent and were blind to the purpose of the study. Most of them lived in Tokyo and its vicinity and had some knowledge of rent in the Tokyo area.

Price Estimation Task

Participants performed the price estimation task (Meshi et al., 2012), where they estimated rents of apartment rooms. Five attributes of each apartment room (room layout, area in square meters, distance form the nearest station, floor level, and building age) were presented on a computer monitor (Figure 1). Based on those set of information, participants estimated the monthly rent of each room (in Japanese yen).

After the initial estimation, another opinion, i.e., advice, on the rent of the room was given in one half of trials (advice condition). We instructed them, “Advice was derived from a real-estate agency who visited our laboratory to participate this experiment another day and judged the rental price for them on the same computer,” but the price was an actual rent of the room around the Takadanobaba station, Sinjyuku, Tokyo. Then, participants were asked to decide whether they would consider changing their first estimation, if so how much. They reported the estimated price by adjusting the slide bar on the monitor with a computer mouse, and decided by clicking the mouse button. In the other half of trials, they did not receive any advice but still were asked whether or not they would like to change their opinions (no-advice condition). No feedback was given about their decision. Advice and no-advice conditions were randomly intermixed and presented 24 times, resulting in 48 trials for the whole session. The trials were divided into four sessions. The next session started after participants pressed the space bar; they were allowed to rest between trials.

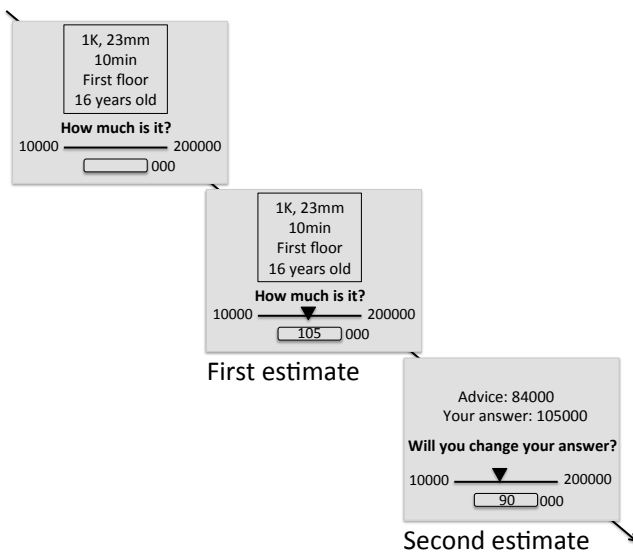


Figure 1: Example of the trial flow of the price estimation task of the present study.

Analysis

In the advice condition of the present task, we obtained two estimates for the rents: the first estimate without advice and the second estimate after receiving advice. The difference between advice and the first estimate represents how much opinions are different between the participant and the advisor. The difference between the second rating and the first rating represents how much the participant changes his or her opinion. In order to examine how much each participant took into consideration or weighed the given advice, we calculated “Weight of Advice” index (WOA; Bonaccio & Dalal, 2006).

$$WOA = \frac{\text{Second estimate} - \text{First estimate}}{\text{Advice} - \text{First estimate}}$$

For example, a participant’s initial estimate was 1000 yen, and the advice was 2000 yen. Assume, after receiving the advice, the participant adjusts her estimate slightly higher, say, 1100 yen. Then, the weight of advice index would be calculated as 0.1, indicating a small influence of advice. On the other hand, the participant may fully use the advice and adjust her estimate to 2000 yen. The calculated weight of advice index would then be 1. It is theoretically possible that WOA is larger than 1 or takes a negative value. However, as such cases would represent behaviors different from normal advice taking or simple response errors, we excluded those data from the analyses (42 trials). Additionally, we also excluded the data from 89 trials whose first estimations were identical to the advice prices, or whose response time is 4 SD above the mean response time of all advice-taking trials. The resulted number of trials was 1165.

Questionnaires

In addition to WOA from each participant, to examine possible influences of participants' personality, mood, and interpersonal reactivity traits on the advice taking in the price estimation task, we used three questionnaires; Ten Item Personality Inventory (TIPI-J; Oshio, et al., 2012; Gosling, Rentfrow, & Swann, 2003); Beck Depression Inventory (BDI; Beck et al., 1961), and Interpersonal reactivity index (IRI; Davis, 1980; 1983; 1996). These questionnaires are widely used to measure participants' personality, mood, and interpersonal reactivity traits in previous studies (e.g, Oshio et al., 2014). All participants were asked to answer those questionnaires.

Results

In Figure 2, we plotted the difference between the first rating and advice, and the difference between the first and second ratings. The horizontal axis is the difference between the advice and the first estimate, representing how much opinions were different. The vertical axis is the difference between the second estimate and the first estimate, representing how much participants changed their estimates. Each dot represents a single trial. In this plot, two lines were apparent. One was a horizontal line at the 0 point of the vertical axis. These data points were from the trials where the participants did not change their estimates at all. Irrespective of the differences in opinions, they simply ignored the advice and did not change their estimates. The other was a diagonal line. The data points on the diagonal line were from the trials where the difference between the advice and the first estimate and the difference between the second estimate and the first rating estimate identical. That is, the participants fully accepted the advice. Then the data between these two lines represented the trials where the participants took the advice but adjusted their estimates partially.

To capture various advice taking behaviors, we calculated the Weight of Advice index (WOA). Figure 3 shows the frequency distribution of the WOA. The data at the WOA of zero correspond to the data on horizontal line in Figure 2, i.e., the participants did not take the advice at all. Out of the total trials of about 1165, 535 trials were this type. By contrast, the trials where the participants fully accepted the advice were at the WOA of 1. These correspond to the diagonal line in Figure 2. 96 trials were this type. WOA values between 0 and 1 represent the trials where the participants partially accepted the advice. In total, advice was used 54% of trials. This acceptance ratio was similar to that observed in the previous study (Soll & Larrick, 2009).

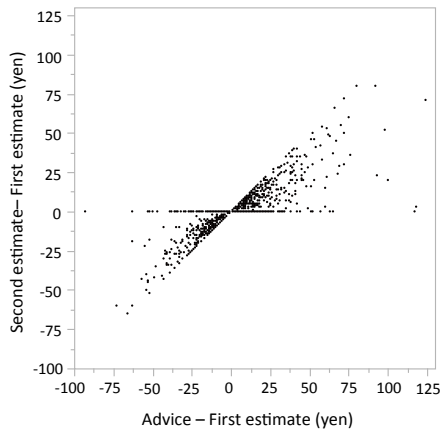


Figure 2: The difference between the second estimate and the first estimate as a function of the differences between advice and the first estimate.

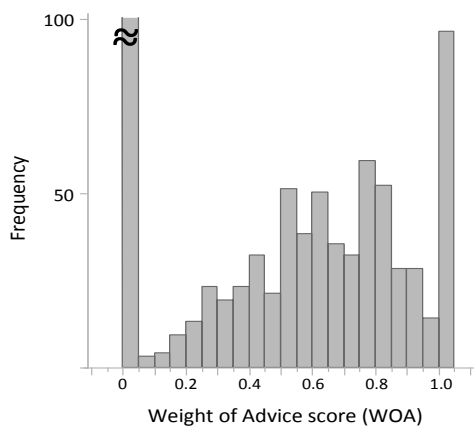


Figure 3: Frequency distribution of the weight of advice (WOA) index.

Variability of advice taking in time

Since the experiment contained 48 trials, we were able to examine how WOA would change as the experiment progressed. Figure 4 shows the averaged WOA scores from all the participants as a function of the trial number. We found that WOA, namely, the tendency to accept advice, gradually decreased over the course of the experiment ($r(48)$

$= -.524, p < .001$). Then, we divided the trials into the first and second halves and found the significant difference of WOA scores between them ($t(1163) = 2.70, p < .01$), indicating that the participants followed the advice less in the second half than in the first half.

One may argue that the decrease in the acceptance of advice over time would be due to that the participants become better in the estimation task and could perform the task without advice in the second half. We did not provide feedback for their estimation. However, they repeatedly saw the rent estimation presented as advice, which were actual rents. In addition, the participants had some knowledge of rent in the Tokyo area. Thus, there was the possibility that participant's estimate would approach to the estimate presented as advice implicitly. To test such a possibility, we also calculated the difference between the advice and the first estimate as an index of the task performance (Figure 5). We did not find any improvement of the task performance as a function of trial number ($r(48) = .041, p = .786$). Therefore, the decrease in WOA was not due to the better performance in the second half.

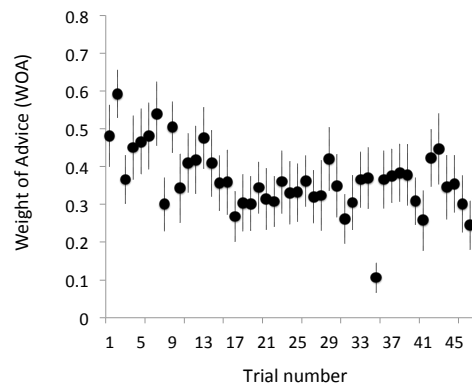


Figure 4: Averaged WOA scores as a function of the trial number. WOA decreased gradually as the number of trials increased. Error bars show the standard errors of the mean scores.

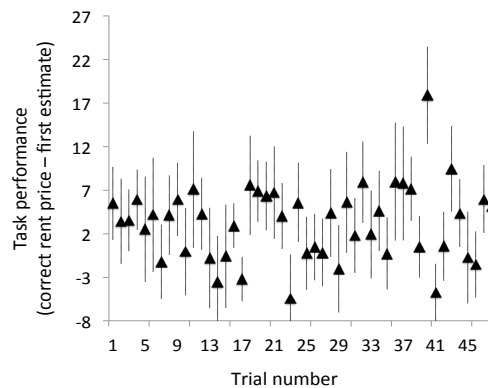


Figure 5: Averaged task performance scores (correct rent price, i.e., advice, minus the first estimate) as a function of the trial number. Error bars show the standard errors of the mean scores.

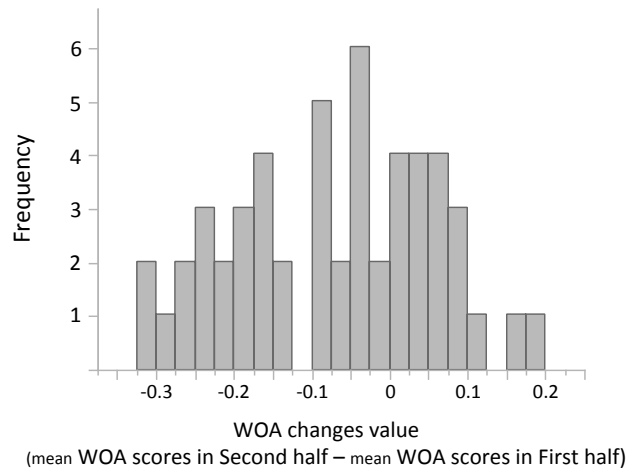


Figure 6: Distribution of WOA changes of each participant. Positive values indicate that the participants accept the advice more in the latter half of the experiment (positive group), while negative values indicate that the participants accepted the advice less in the latter half of the experiment (non-positive group).

Variability among individuals

The overall results suggested that, on average, the participants followed advice less in the second half than the first half of the task. However, this was not the case for all the participants; some participants did show larger WOA in the latter half. We calculated the change of WOA for each participant by subtracting WOA in the first half from WOA in the second half. Thus, a positive score would indicate that the participants tended to accept the advices in the second half. Figure 6 shows the distribution of WOA changes.

We divided the participants into the “positive-group” (WOA changes values were positive) and the “non-positive group” (WOA changes values were negative or equal to zero), and examined whether there would be any individual differences between the two groups of the participants. The questionnaires measured depressive state, big-five personality trait (Extraversion, Conscientiousness, Agreeableness, Openness to Experience, and Neuroticism), empathy for others (cognitive abilities on a Fantasy Scale (FS) and Perspective Taking (PT), and affective components through an Empathic Concern (EC) and Personal Distress (PD). We compared the scores of the questionnaires between the positive group and the non-positive group. Two participants were excluded from the analyses because significant parts of the questionnaires were incomplete. In total, the data from fifty-two participants were analyzed.

We found significant differences in depressive state ($t(50) = 2.30, p < .03$) and in perspective taking (PT) scores ($t(50) = -2.48, p < .02$). The participants who showed the positive WOA changes had lower depression scores and higher perspective taking scores (Figure 7). These results suggest that individuals with less depression and higher perspective taking tend to keep taking the advice. There was

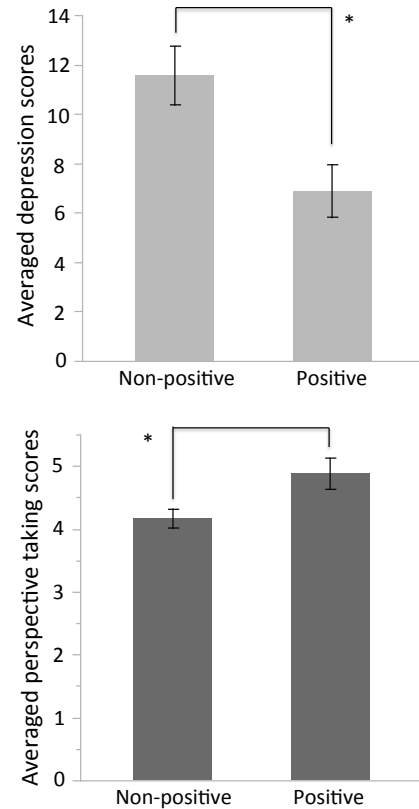


Figure 7: Averaged depression and perspective-taking scores for different WOA changes groups (non-positive and positive groups). Error bars show the standard errors of the mean scores.

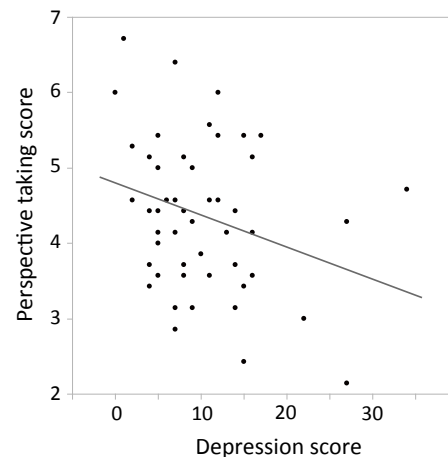


Figure 8: The relationship between the depression and perspective-taking scores.

a significant negative correlation between the depression and the perspective taking scores ($r(52) = -.293, p < .05$; Figure 8). All the other scores did not show any significant difference.

Discussion

In the present study, we examined how people would change and vary in accepting advice when the effectiveness of advice was not clear. We found that: (1) Participants took the advice less in the latter half of the experiment. (2) The decrease in WOA was not due to the change in task performance. (3) The decrease of WOA was pronounced in the participants with high depressive state and low perspective taking tendency of empathy. In other words, the participants with low depression and high empathy kept taking advice even when the effectiveness of advice was unclear. Our results suggest that the willingness of accepting and using advice changes with prior experience of advice taking and the individual traits and mood interact with the change in advice taking.

In about 54% of trials, the participants used advice either fully or partially, even though the usefulness of advice was not clear. This result suggests that it is difficult to ignore advice completely under uncertainty of usefulness of advice. Previous studies suggest that the major motivation of seeking advice is not only for accuracy in decision making but also for social reasons, for example sharing responsibility or to justify our decisions (Kennedy, Kleinmuntz, & Peecher, 1997; Harvey & Fischer, 1997). Our results might reflect this kind of social motivations in advice taking.

Since the participants were not sure about whether advice was useful or not in the present study, it was reasonable to assume that the acceptance of advice would reduce over time. However, this was not the case for all the participants; low depressive and high perspective taking participants kept taking advice. Also, there was the negative correlation between depressive scores and perspective taking scores. It has been reported that depression is associated with focused attention on the self rather than others (Ingram, 1990) and focusing increases the accruing periods and severity of depression (e.g., Just & Alloy, 1997; Kuehner & Weber, 1999; Nolen-Hoeksema, 2000; Nolen-Hoeksema, Parker, & Larson, 1994). However, it still remains to be investigated how depressive mood and the ability of perspective taking influence and/or interact with advice taking behavior.

In the present study, we set the situation that advice was derived from a real-estate agency. There is the possibility that this information about advisor would help to increase the acceptance of advice even when the effectiveness of advice was not clear. A previous research showed that people valued expert advice than novice one when making decisions (e.g., Meshi et al., 2001). Therefore, the characteristics of an advisor have influences in advice taking, which include not only expertise but also how closely the advising person is related. In our daily-life, we often ask friends or family for advice, even though we can seek expert advice. Recent research suggests that advice would be accompanied by social and emotional support (i.e., regulating emotional distress), and decision makers prefer such emotional and social support when they make decisions (Horowitz et al., 2001; Dalal & Bonaccio, 2010).

In the future research, it would also be interesting to examine the role of seeking or accepting advice derived from others that have close associations with them, such as friends or family.

In the present study, no feedback was provided. It is possible that providing feedback may affect the acceptance of advice over time. We found the decrease of WOA over time when the effectiveness of advice was uncertain. Providing feedback would make participants to explicitly adjust their estimates. In future research, it would be important to examine the effects of feedback on temporal variations for the acceptance of advice.

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References

- Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of general psychiatry*, 4, 561-571..
- Bonaccio, S., & Dalal, R. S. (2006). Advice taking and decision-making: An integrative literature review, and implications for the organizational sciences. *Organizational Behavior and Human Decision Processes*, 101, 127-151.
- Cooper, R.S. (1991). Information processing in the judge-advisor system of group decision-making. *Unpublished master's thesis*, University of Illinois, Urbana-Champaign.
- Dalal, R. S., & Bonaccio, S. (2010). What types of advice do decision-makers prefer?. *Organizational Behavior and Human Decision Processes*, 112, 11-23.
- Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology*, 10, 85.
- Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, 44, 113-126.
- Davis, M. H. (1996). *Empathy: A social-psychological approach*. Boulder, CO: Westview.
- Gino, F., & Moore, D. A. (2007). Effects of task difficulty on use of advice. *Journal of Behavioral Decision Making*, 20, 21-35.
- Gino, F., & Schweitzer, M. (2008). Blinded by anger or feeling the love: How emotions influence advice taking. *Journal of Applied Psychology*, 93, 1165-1173.
- Gino, F., Brooks, A. W., & Schweitzer, M. E. (2012). Anxiety, advice, and the ability to discern: feeling anxious motivates individuals to seek and use advice. *Journal of personality and social psychology*, 102, 497.
- Gosling, S. D., Rentfrow, P. J., & Swann, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in personality*, 37, 504-528.
- Harvey, N., & Fischer, I. (1997). Taking advice: Accepting help, improving judgment, and sharing responsibility.

- Organizational, *Behavior and Human Decision Processes*, 70, 117-133.
- Horowitz, L. M., Krasnoperova, E. N., Tatar, D. G., Hansen, M. B., Person, E. A., Galvin, K. L., & Nelson, K. L. (2001). The way to console may depend on the goal: Experimental studies of social support. *Journal of Experimental Social Psychology*, 37, 49-61.
- Ingram, R.E. (1990). Self-focused attention in clinical disorders: re- view and a conceptual model. *Psychological Bulletin*, 109, 156-176.
- Just, N., & Alloy, L. B. (1997). The response styles theory of depression: tests and an extension of the theory. *Journal of abnormal psychology*, 106, 221.
- Kennedy, J., Kleinmuntz, D. N., & Peecher, M. E. (1997). Determinants of the justifiability of performance in ill-structured audit tasks. *Journal of Accounting Research*, 35, 105-123.
- Kuehner, C., & Weber, I. (1999). Responses to depression in unipolar depressed patients: An investigation of Nolen-Hoeksema's response styles theory. *Psychological medicine*, 29, 1323-1333.
- Meshi, D., Biele, G., Korn, C. W., & Heekeren, H. R. (2012). How expert advice influences decision making. *PLoS One*, 7, e49748.
- Nolen-Hoeksema, S. (2000). The role of rumination in depressive disorders and mixed anxiety/depressive symptoms. *Journal of abnormal psychology*, 109, 504.
- Nolen-Hoeksema, S., Parker, L. E., & Larson, J. (1994). Ruminative coping with depressed mood following loss. *Journal of personality and social psychology*, 67, 92.
- Oshio, A., Shingo, A. B. E., & Cutrone, P. (2012). Development, Reliability, and Validity of the Japanese Version of Ten Item Personality Inventory (TIPI-J). *Japanese Journal of Personality*, 21, 40-52.
- Oshio, A., Abe, S., Cutrone, P., & Gosling, S. D. (2014). Further validity of the Japanese version of the Ten Item Personality Inventory (TIPI-J). *Journal of Individual Differences*, 35, 236-244.
- Snizek, J. A., & Van Swol, L. M. (2001). Trust, confidence, and expertise in a judge-advisor system. *Organizational behavior and human decision processes*, 84, 288-307.
- Soll, J. B., & Larrick, R. (2009). Strategies for revising judgment: How (and how well) people use others' opinions. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 35, 780-805.
- Yaniv, I. (2004a). The benefit of additional opinions. *Current Directions of Psychological Science*, 13, 75-77.
- Yaniv, I. (2004b). Receiving other people's advice: Influence and benefit. *Organizational Behavior and Human Decision Processes*, 13, 1-93.
- Yaniv, I., & Kleinberger, E. (2000). Advice taking in decision making: Egocentric discounting and reputation formation. *Organizational Behavior and Human Decision Processes*, 83, 260-281.