The Formation of Attitudes and Social Judgments in a Virtual School Class Environment

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Beyond the Individual: The Social Psychological Approach to Interpersonal Behavior

How social is social psychology? Whatever the answer is to this frequently asked question, it is obvious that the mission and scope of social psychology goes beyond the individual as unit of analysis. The social-psychological research program is by definition not confined to the study of intrapsychic functions, such as perception, learning, memory, emotion, and judgment. It is rather devoted to the description and explanation of the manner in which individual behavior comes to interact with other people in meaningful situations, and the way it is entrenched in groups, organizations, cultural and ecological systems.

No doubt, these ambitious goals are reflected in such truly social research topics as love and partnership, aggression and prosocial behavior, prejudice and discrimination, intergroup relations and inter-cultural comparisons. Virtually all pertinent textbooks devote chapters to these prominent themes, and it seems justified to say that these chapters testify to flourishing research in all these areas.

Interpersonal phenomena vs. interpersonal theories. However, closer inspection reveals that this optimistic appraisal has to be qualified in at least one crucial way. Although large areas of social psychology are deeply social at the level of behavioral phenomena, this can be hardly claimed to be the case at the level of theoretical explanations. Although the literature is replete with *phenomena* that transcend the individual, most *theoretical explanations* that are proposed to understand these phenomena adhere to the same intrapsychic rules that have been established in non-social approaches to cognition, motivation, emotion, and personality. Aggression, for instance, is commonly explained in terms of the individual’s emotions and exposure to aggression cues (Berkowitz & Buck, 1967), the individual’s alcohol consumption, learning from the media, and of course in terms of personal dispositions and constitutional factors such as gender and testosterone. Likewise, altruism is assumed to reflect individual’s motive to overcome negative affective states, and even communication is all too often reduced to individual’s mastery of lexical, grammatical, and pragmatical rules.

To be sure, some theoretical accounts do refer to social episodes (Forgas, 1982) or to such social operations as learning by imitation (Bandura, 1978), maxims of conversation (Grice, 1975; Wänke, 2007) or cultural norms (Mog & Morris, 2010). However, closer inspection shows that even these super-individual functions are typically explained at the individual level. After all, social learning theory is based on the imitation capacity of an individual who identifies with a model that not even needs to be an animate being. The theory does not refer to any emergent interaction, structural interdependence, or dynamic relation between learner and model. Maxims of conversational logic are treated much like rules of propositional logic in cognitive psychology. There is nothing relational in Grice's (1975) theory that could explain the dyadic shaping of conversations, or interpersonal negotiations of utterance interpretations. And, similarly, the explanation of social norms hardly differs from non-social values and utilities. That is, norms are conceived as internalized individual beliefs and commitments to preferred action tendencies.

Indeed, the available repertoire for building theories above and beyond the individual appears to be greatly restricted in contemporary (social) psychology. Current theorizing is so deeply entrenched in individual-level causes that this statement may be hard to understand. It is not quite clear what alternative there might be. So what would be an example of an alternative conception that transcends the individual? Suitable answers are in fact easy to find, as several examples are actually quite prominent, though somewhat neglected in mainstream social psychology. Interpersonal models of behavior, which are not rooted in individual motives and mental capacities, can be found in game theory (Van Lange, Agnew, Haarinck & Steemers, 1997) research on democratic decision rules (Regenwetter, 2009; Sorkin, Luan, & Itzkowitz, 2004), dynamic-systems theory (Vallacher & Nowak, 2007), or biological studies on foreaging behavior (Pirolli & Card, 1999). In a coordination game, for instance, each player's payoff is contingent on her ability to synchronize and coordinate her behavior with another player's behavior (e.g., their ability to make congruent predictions or moves).

Effective foreaging, similarly, means to organize and distribute social behavior, avoiding for instance that everybody competes for the same attractive resources rather than exploiting other sources with slightly lower outcomes but much less competition.

Intrusion of new theories. There is a conspicuous lack of reference to such models in contemporary social psychology, maybe because these models are often presented in formal notation, or because they do not refer to motives, needs, and capacity constraints as ultimate explanatory devices. However, recently, this situation seems to be changing slowly, as a new interest arises in theories that emphasize the impact of environmental constraints on behavior. Although these new developments do not take place in social-psychological outlets like JPSP, JESP, or PSPB, but in Psychological Review, JEP: General, or in several decision-making journals and book projects (Hertwig & Hoffrage, in press; Todd & Gigerenzer, in press), their intrusion into social psychology and social cognition can be hardly overlooked (Denrell & LeMens, 2007; Fiedler, 2007; Fiedler & Wänke, 2009; Krüger, 2011).

The unifying premise of these new approaches – much in the spirit of Lewin (1955) and Brunswik (1951) – says that in order to understand the intra-psychic processes within the individual, we first of all have to understand the nature and distribution of the environmental input that impinges on the individual. This basic insight gave rise several models that highlight the impact of environmental sampling processes on behavior (for an overview, see Fiedler & Juslin, 2006). Central to these sampling models is the assumption that biases in cognition and behavior need not reflect selective processing of stimulus input within the individual, due to selective memory, wishful thinking, or uncontrolled emotional influences. On the contrary, many pertinent studies testify to the remarkable accuracy, and high fidelity with which individuals process the given stimulus sample even in capacity-demanding, complex task setting. Very often, instead, the causal origins of biases in cognition and behavior can be found in the samples provided by the environment. These samples are rarely ever random or representative of reality. Most of the time, the environmental samples to which individuals are exposed are seriously biased in multiple ways, prior to any intra-psychic processes. These sampling biases favor proximal, visible, communicable, pleasant, and self-relevant stimulus information over distal, invisible, incommunicable, unpleasant and self-irrelevant input. Moreover, social information sampling is by no means a stochastically independent process. Subsequent stimuli are normally highly dependent on each other, and strong procedural constraints (e.g., discussion rules; turn-taking; dominance hierarchies; access limitations) are imposed on social sampling processes. Not surprisingly, the proportion of variance that can be explained by these extra-individual constraints can be higher than the variance accounted for by differences in the favorite intra-individual variables.

Preview of Research Reported in the Present Chapter

The Virtual School Class. In the remainder of this chapter, I try to illustrate and substantiate the sampling approach with empirical evidence from a single experimental paradigm, the Virtual School Class (VSC). In this paradigm (Fiedler, Freytag & Unkelbach, 2007; Fiedler & Walther, 2004; Fiedler, Walther, Freytag & Plessner, 2002), participants have to play the role of a teacher whose task is to gather systematic information about the performance of all students in a school class, which is represented on the computer screen. In earlier research, the school class was only depicted graphically, with 16 male and female Christian names on rectangular frames representing the students' desks, along with the possibility to consider photographs of the children associated with the names. Even in this earlier version, the VSC was experienced as semi-naturalistic and highly motivating by the student participants, who reported developing vivid relationships to individual students and high levels of accuracy and fairness motivation when it came to grading decisions (i.e., performance ratings). In a recent version, now, the VSC is based on multi-media software that creates really naturalistic stimulus input. Photographs of twelve students are arranged in three rows of a seminar room (see Figure 1). They are either sitting passively or raising their hand. When selected by the teacher, a film clip would be inserted, presenting a correct or incorrect answer in audio-video format, thus approximating a virtual stimulus environment that resembles the input gained by teachers in the real world.

In most experiments, the same teacher is running several sessions or lessons devoted to different subject matters (English, German, Maths, Physics). Within each lesson, the teacher samples information across multiple trials. On every trial, the teacher first selects a knowledge question from a pull-down menu, which is then inserted on top of the screen. The teacher must then select one of the students who raise their hand, signaling their willingness to answer the question. The answer provided by the chosen student is either correct or wrong. Across many trials of this kind, the participant can assess all students' performance on two dimensions, motivation (probability of raising hand) and ability (probability of correct responses). Their final percentage ratings of motivation and ability, provided for all students separately for every lesson, can be compared to the objective parameters, that is, the probability with which the computer program lets the students raise their hand, or provide correct answers when given an opportunity, respectively.

Sampling vicissitudes in the VSC. The goal of the VSC environment was to create an experimental task that is less impoverished and restricted to a few isolated experimenter-provided stimuli than traditional experimental tasks. Although the performance parameters, task instructions, and various other procedural rules are under experimental control, the information sampling process is dynamic and open to emergent extra-individual processes. On one hand, the resulting sample depends on the teachers' selective attention to specific students, the kind of hypothesis they are pursuing, and the teachers' uncertainty and information need. However, on the other hand, teachers cannot alone determine the sampling process. Their information input is also contingent on external support in that they can only solicit a response from a student who actually raises his or her hand. Additionally, information search is constrained by the salience or sitting position of different students, by the need to collect sufficient information for the grading of all students, or by the specific judgment task emphasized in the instruction (e.g., to compare the performance of boys and girls in specific lessons).

Even though the task is complex and demanding, calling for several quantitative ratings of every student in every lesson, the final judgments are often remarkably accurate and sensitive to existing differences (between students, lessons, or reflecting changes over time). Capacity restrictions or lack of motivation – the favorite constructs in traditional research on attitude and judgment formation – are playing only a minor role. Nevertheless, the general accuracy level leaves sufficient latitude for systematic biases and judgment illusions that are diagnostic of underlying sampling biases. The following review of pertinent research should illustrate this point and at the same time highlight the extra-individual origins of the empirical phenomena, which cannot be explained in terms of intrapsychic constraints like wishes, needs, expectancies, goals, or capacity restrictions.

Judgment Biases Originating Outside the Individual: Empirical Evidence

Judges and Targets Co-Determine Information Sampling

As already mentioned, systematic biases in the VSC can be quite strong, in spite of a generally high level of accuracy. In one study (Fiedler & Walther, 2004, pp. 137-140), teachers assessed the students' performance across three sessions. All student motivation parameters were held constant at m = .5, that is, the rate with which they raised their hands was always 50% (as randomly generated on every trial). The ability parameters changed differentially for different subsets of students (taking on values of a = .2, .35, .5, .65, or .8). On aggregate, most teachers were not only quite sensitive to differences between students within the same lesson, but even to changes between lessons. However, a glance at Table 1 reveals that teachers developed and conserved strong and systematic biases across all three sessions. The correlations in Table 1 between deviation scores (i.e., signed deviations of motivation and ability ratings from m and a, respectively) are persistently strong and positive, indicating that teachers overestimate some students (consistently on both ratings) and underestimate others throughout the entire experiment.

Although somewhat surprising in strength, this result is actually in line with traditional notions like halo effects or confirmation biases (Nickerson, 1998). Teachers may like some students and dislike others, ask more difficult questions to some students than others, and they may construe unwarranted correlations between motivation and ability, which were in fact orthogonal. In any case, this traditional explanation would typically blame the teacher for the strong and persistent illusion. However, analyses of sampling effects in the VSC paradigm suggest that this presupposition is premature, showing that students and teachers co-determine the resulting bias. What the correlations in Table 1 show is that teachers extract the actually existing performance differences for some students more readily than for others. Thus, the unequal, error-prone, and often very small samples they receive for different students let them correctly identify some smart students and some poor students, while impoverished or biased samples do not allow them to identify other students with the same parameters. The next study will provide direct evidence that this kind of selective sampling reflects a genuine interaction between teacher subjects and student objects.

Samples mediate the outcomes of judgments. In this experiment (Fiedler et al., 2002, Exp. 3), we deliberately manipulated the size of samples via the *m* parameter. While the *a* parameter was constantly high (a = .7) or low (a = .3) in different class environments, the motivation parameter varied between students of the same class (from m = .2 to .5 to .8). Even when given the same attention to all students, high-*m* students should raise their hand more often than low-*m* students. Consequently, teachers should have more opportunities to assess the ability of high-*m* than low-*m* students, just because the sample size should be higher for the former than for the latter. The results support the notion that student participation rate triggers the teachers' judgment accuracy. Both smart students' high ability and poor students' low ability were more readily recognized when participation rate was high rather than low. In other words, the teachers' selective accuracy in discerning student performance was largely determined by the degree to which the student targets' active behavior supported the teachers' information sampling process.

Note that this pattern of findings is inconsistent with the contention that participants simply confuse motivation and ability ratings, because under high cognitive load they are unable to discriminate between raising hands (a knowledge cue) and correct answers (the ultimate criterion). The high illusory correlations in Table 1 might actually appear to suggest this interpretation. However, other experiments (Fiedler et al., 2002, Exp. 1) demonstrate vividly that teachers can clearly discriminate between both performance aspects. When students only vary in *a*, but not in *m*, this is only manifested in teachers' ratings of ability but does not carry over to their ratings of motivation (Figure 3). Conversely, when students only vary in *m* but not in *a*, the resulting judgments effects are also confined to ratings of motivation as opposed to ability.

Note also that there is no evidence for the careless intra-psychic judgment biases, such as halo effects or simple expectancy biases. Positive or negative impressions do not carry over from ability to motivation or vice versa. Nor is there any evidence for generalizing inferences from one lesson to another. When students exhibit distinctly high (a = .8) or low performance (a = .2) in some lessons, but non-distinct, intermediate performance (a = .5) in others, the teachers' new ratings are hardly biased toward the previously observed (and correctly evaluated) performance. The crucial determinant of performance ratings are not the teachers'expectancies and prejudices but, rather, the actually observed sample input, which is typically extracted at a high level of accuracy.

One might conjecture that in the experiments reviewed so far, we only examined the dependence of information sampling on student parameters, but we did not make any attempts to demonstrate the systematic impact of the teachers' search strategies. To deal with this fully justified conjecture, let us therefore consider the following experiment on the testing of gender-stereotypical hypotheses in the VSC.

Search strategies are contingent on environmental support. Participants in this experiment (Fiedler et al., 2002, Exp. 2) were instructed to test the stereotypical hypothesis that girls are good in language whereas boys are good in science. The actual distribution of high and low *a* parameters was the same for boys and girls. A common information search strategy on such a task is positive testing (Fiedler, Walther & Nickel, 1999; Klayman & Ha, 1987). Hypothesis testers gather mostly information about the kind of information that is the focus of hypothesis. That is, in the present case, they tend to sample mostly observations about girls in language and about boys in science, while yielding clearly smaller samples for girls in science and for boys in language lessons.

Note in passing that positive testing is neither irrational (Oaksford & Chater, 1994) nor does it pre-determine a confirmation bias (Fiedler et al., 1999). For instance, given a boy and a girl with the same high $a = .8$ parameter in maths, positive testing may yield unbiased samples of 8 correct and 2 incorrect answers by the boy, as compared to 4 correct and 1 incorrect answers by the girl. In both cases, the correctness rate is .8. To really explain why the larger sample leads to higher ability ratings than the smaller sample, one has to resort to the principle of differential regression (cf. Fiedler & Krüger, in press). Smaller samples inform more regressive judgments (that less clearly distinguish between smart and weak students) than large samples, for regression is a linear function of unreliability, which increases with decreasing sample size. Regression is an essential property of probabilistic environments; it is largely ignored as an explanatory construct in intrapsychic theories of social cognition.

As predicted, smart girls received higher ability ratings than equally smart boys in language (English and German), whereas smart boys received higher ratings than equally smart girls in science. However, crucially, this pattern was confined to the majority of those teachers who actually engaged in positive testing, that is, who drew larger samples for girls in language and for boys in science. A minority of teachers who did not engage in positive testing were not influenced by the gender stereotype. Exactly the reverse pattern, by the way, was obtained in another, counter-stereotypical condition, in which teachers were instructed to test the opposite hypothesis that, in this particular class, girls excel in science whereas boys excel in language. Regardless of the opposite expectancy, most teachers again engaged in positive testing, drawing larger samples for boys in language and for girls in science. As a consequence, smart girls were now rated higher than boys in science whereas smart boys were rated higher than equally smart girls in language.

All this refined pattern of results, which clearly reflect the teachers' sampling strategies, were however perfectly contingent on the students' cooperation. Only when the students' *m* parameters supported the teachers' positive testing strategy, so that they raised their hands often in the conditions corresponding to the positive-testing focus (e.g., boys in science and girls in language), the systematic stereotype (or counter-stereotype) bias was obtained. In another condition, in which students' *m* parameters interfered with the positive-testing effect on sample size, the entire pattern disappeared. Thus, even though teachers' search strategies were the focus of the major manipulation of this experiment, the ultimate outcome of the hypothesis testing process depended crucially on the complementary role played by the students' in the stimulus environment.

It is important to realize that any cogent explanation of the resulting evaluation biases must be anchored in a genuine interpersonal interaction between teachers' search strategies and students' participation in the sampling process. This interaction is orthogonal to the intra-personal main effects that dominate traditional accounts of confirmation bias and self-fulfilling prophecies: (a) Teachers' gender stereotypes *per se* only play the role of a default hypothesis; a reversed hypothesis leads to reversed sampling strategies and reversed results. (b) The causal path hypothesis focus → positive testing → unequal sample size → differential regression → systematic judgment does not reflect the participants' intentions, goals, expectancies, or prior knowledge. (c) The crucial match between the teachers' positive testing strategies and the students' selective participation rates, which may either accentuate or eliminate unequal sample sizes, must be understood as a property of social interaction rather than main effects of the individual teachers' or students' attributed. And last but not least, (d) the teachers' mental capacity, which is so central for leading intra-personal dual-process theories, is quite irrelevant for the present extra-personal scenario. If anything, the distinction between deep and shallow processing applies to the students, who provide large versus small samples in different disciplines, rather than to the teachers' residual mental capacity.

Who is to blame? Along with this theoretical explanation shift, from intra-personal dispositions and motives to extra-personal system interactions, we have to re-think such questions as, who is to blame, or what remedies or interventions can be used for debiasing. Differential regression, resulting from unequal sample sizes' unequal reliability, is not a personal fault or weakness; it is a property of all information-processing systems, human or technical. It does not matter why the samples for two equally smart students differ: because the teacher likes one more than the other, because of their attraction and appearance, their participation rate, absenteeism, sitting position, or the teacher's selective forgetting due to differential familiarity with students. The result is the same; large samples will render actually existing attributes (e.g., high vs. low ability) more easily assessable than small samples.

In a similar vein, extra-personal accounts call for fundamentally new rationales regarding useful interventions. It is obvious that any treatments that affect the teachers' expectancies, prejudices, or mental resources would hardly eliminate the reported pattern of biases. It would also be naïve to believe that an appropriate intervention would be to equate all sample sizes, that is, to solicit an equal number of answers from every student. Given two students with markedly different participation rates, say m = .2 versus m = .8, enforcing the same sample size for both students would not eliminate but would probably exacerbate sampling biases. This is because a low-*m* student can be expected to raise her hand only when she knows the correct answer quite well, whereas a high-*m* student (of comparable ability) can be expected to be much less conservative, raising her hand often when she is not perfectly certain of the correct answer. Rather than trying to isolate ability from motivation, or *a* from *m*, the VCR approach highlights that both performance aspects are intrinsically interdependent in probabilistic environments, calling for a psychological theory of relativity. Just as Albert Einstein's theory of relativity tells us that there is no absolute speed but only relative speed, which depends on the beholder's own standpoint, we may have to accept that absolute student ability cannot be isolated from beholder's sample.

Adaptive Sampling is Sensitive to Both Epistemic and Hedonic Constraints

To gain a deeper understanding of the causes and reasons for biased sampling, and why there is little motivation in reality to equate sample size, it is enlightening to consider one particularly thought-provoking class of sampling models that have been recently advanced by Denrell (2006) and Denrell and Le Mens (2007). The starting point for these models is an old and well-established (intra-psychic) principle of learning and behavior, which Thorndike's (1898) once called the "law of effect". According to this basic law, behaviors associated with pleasant experiences are more likely to be repeated than behaviors associated with unpleasant experiences. This uncontested rule introduces an essential source of asymmetry in the process of information search: Individuals will tend to continue sampling as long as the outcome it is pleasant, but they tend to truncate sampling as soon as it gets unpleasant. This theorem follows naturally from the axiomatic assumption that organisms tend to approach pleasant and to avoid unpleasant stimuli. This applies particularly to hedonically relevant situations in which organisms are not only interested in epistemic information but actually consume the stimuli they are sampling.

How the "law of effect" impact sampling behavior. A universal consequence of the law of effect applied to information sampling is a generalized positivity bias in information search, leading to a negativity bias in resulting evaluations. When a stimulus object provides the individual with pleasant or positive experience, the sampling process will continue until samples are large enough to correct for any errors in small and very small samples at the beginning of the process. In contrast, unpleasant stimulus objects that truncate the sampling process at an early stage prevent the individual from correcting initial sampling errors. If a primacy effect yields too unpleasant an initial sample, this negative impression bias cannot be corrected because the sampling process is truncated.

As illustrated and elegantly explained in several computer-simulation studies, the depicted kind of asymmetric sampling process can account for many major phenomena in social psychology, such as the persistence of negative stereotypes, the derogation of outgroups, the debiasing influence of intergroup contact, and the development of correlated judgment and attitude biases in friends or neighbors, who are jointly exposed to the same sampling experience (see Denrell & LeMens, 2007).

Law of effect in the school class. While Denrell and colleagues based their insights mainly on computer simulation studies, the VSC paradigm suggests itself for a straightforward empirical test. We only have to assume that teachers' information sampling is partly driven by the hedonic goal to deceive themselves and others about their teaching ability rather than exclusively by the epistemic motive to accurately estimate students' performance. Then we can expect to find the same positive-negative asymmetry as in Denrell's seminal work.

Initial support for this prediction was in fact obtained in several VSC experiments. First of all, there is a pervasive tendency for teachers to solicit more answers from smart (high-a) than from poor (low-a) students with comparable m parameters. This sampling bias is relatively independent of the teachers' explicit payoffs (i.e., whether teachers are only measuring students' achievement or teachers' own payoffs depend on their students' apparent performance). In any case, they sample more answers from smart than from poor students, although the design warrants that high *a* is not confounded with high *m* (i.e., weak students raise their hands as often as smart students). Secondly, this asymmetric focus on satisfying students leads to asymmetric evaluations in that high ability is more readily extracted from the sample of observations than low ability. And third, the degree of this evaluation asymmetry is actually mediated by the inequality of samples resulting from asymmetric information search.

This asymmetric pattern not only testifies to the usefulness of the sampling approach to judgment and attitude formation. It also helps us to understand some additional VSC findings. For instance, the commonly obtained illusory correlation between ratings of ability and motivation, even when both student parameters are carefully controlled to vary orthogonally, can be understood as a natural consequence of an asymmetric sampling process that confounds high ability and experienced sample size as a proxy for motivation inferences. This illusory correlation can particularly explain the data presented in Table 1 at the outset. Given that the subset of students who mostly attract the teachers' attention are also associated with predominantly high achievement, it seems plausible that these students should receive higher ratings on both dimensions than the average student, thus producing an illusory correlation.

One might conjecture, again, that the illusory correlation between ability and motivation reflects a prior belief rather than a sampling effect. However, again, the VSC allows us to pit this intra-psychic account against the sampling account. Thus, if all students in a class are homogeneously high or low in their ability parameter, so that teachers cannot selectively focus on the most satisfying ones, then the illusory correlation should disappear – in spite of any existing beliefs. This is because such a homogeneous environment prevents teachers from hedonically motivated selective sampling biases toward the smartest students and, consequently, prevents them from soliciting large samples that accentuate the co-occurrence of high ability and high salience of (self-generated) participation rates. As already demonstrated in the experiment underlying Figure 2 above, if all students are similarly low in ability, continued sampling in this case will clarify the low ability of students in a low performing class to the same extent as it clarifies the high ability of students in a constantly smart class, thus eliminating the illusory correlation between motivation and ability.

Refining the Analysis of Information Sampling

The VSC findings reviewed so far testify to the originality and fertility of environmental sampling models, the theoretical implications of which go beyond the implications of intra-psychic accounts of the social-cognition tradition. However, useful theoretical models should not only inform distinct and counter-intuitive predictions. They should also be formulated precisely enough to enable real controversies. To illustrate this point, let us finally engage in a more refined analysis of the sampling process and compare the relative viability of two related but psychologically different sampling models to account for the VSC data. Up to here, I have portrayed the evidence as largely consistent with the hedonic sampling model advanced by Denrell and colleagues. In the present section, though, I will contrast this model with another sampling model that we have proposed in our own articles (Fiedler, 1996; Fiedler & Walther, 2004; Fiedler et al., 2002), suggesting that the latter model is actually more appropriate to the VSC environment than the model suggested by Denrell.

To render this model comparison as intelligible, let us briefly review one seminal study by Fazio, Eiser and Shook (2004), which actually preceded and motivated Denrell’s (2005) first paper. In this study, announced as a paradigm for attitude formation through exploration, participants were asked to take the role of a biological organism that has to maximize the energy gained from food. A large number of beans were distributed in a two-dimensional grid. All beans looked alike but they greatly differed in the probability with which they provided a high amount of energy. Learning to distinguish between beans high and low in expected energy value could thus only rely on the beans’ location in the grid, which had been associated with positive or negative feedback on previous trials. As time and resources for food acquisition were restricted and participants had to consume the very beans they sampled, it is no surprise that they soon stopped sampling in frustrating locations and in their nearest neighborhood. By radically avoiding a large number of potentially worthless beans, they could therefore enhance their energy payoff.

An important side effect of this highly selective hedonic strategy, to be sure, was the already familiar valence asymmetry. Only first impressions of positive beans could be corrected over time. In contrast, negative initial impressions, of which some were exaggerated, could not be corrected later. Negative initial attitudes were thus clearly more enduring and had a stronger impact on subsequent attitudes than positive initial impressions.

Adhering to extreme anchors vs. gradual polarization. Returning to the VSC paradigm, though, the question is whether the sampling behavior observed in the Fazio et al., (2004) study and analyzed in Denrell's simulation studies can also be expected in the context of student evaluations. Note that the judgment process entailed in this sampling model assumes an asymmetric anchoring and insufficient adjustment process (cf. Tversky & Kahneman, 1986). Negative initial anchors, which often reflect an overestimation, due to sampling error, of the actual degree of negativity, cannot be adjusted when sampling is truncated. Positive initial impressions are not subject to similar adjustment failure, because sampling from positive sources will continue. Crucial to this process account is the assumption that initially extreme impressions differ in their probability of correction, or their regressive adjustment toward less extreme values.

Here is an alternative process account that I believe is more appropriate to sampling about human beings in social environments like the VSC. In this account, all initial attitudes are assumed to be intermediate or neutral, analogous to Laplace's principle of insufficient reason or the Bayesian habit to start from equal priors. In other words, all students can be supposed to have middling ability values at the beginning. This flat profile will hardly change after one or two observations of students providing correct or incorrect answers. As information accrual increases, the initially moderate attitudes will become more and more extreme and approach the true latent ability parameters from which the observations are generated. The larger the sample size, the more closely the learned judgments or attitudes will approximate the true value. Because positive targets (i.e., smart students) are more likely sampled and yield larger samples than negative targets, this implies that ratings of positive targets will be less regressive and more veridical than ratings of negative targets, which should suffer from impoverished samples.

Thus, contrary to a process that fails to correct for initial extreme anchors, the latter process starts from moderate impressions, or flat priors, and moves toward more pronounced attitudes over time. Both processes predict valence asymmetries. They both predict that impressions of positive targets should be generally more accurate than negative impressions, and these asymmetries should be mediated by unequal samples sizes. However, the two models also differ in crucial respects. The anchoring account implies that strong attitudes exist from the beginning, and that negative attitude targets remain more extreme than positive targets, whereas the alternative account assumes that attitudes are formed only gradually and that differential regression yields more extreme positive than negative attitudes in the VSC.

Indeed, a recent study (Fiedler, Hess, Woellert & Tauber, 2011) lends unequivocal support to the latter process account. As already reported, teachers do sample more from smart than from weak students, and ratings of the former are therefore more accurate and less regressive than ratings of the latter. However, crucially, comparisons of students with small and large samples reveal that extremity increases with increasing samples size, rather than moderating initially too extreme anchor values. Moreover, when student parameters are changed from one session to the other, teachers are more likely to recognize improvements of formerly weak students than declines of formerly strong students, contrary to the notion that hedonic experience will prevent teachers from adjusting negative impressions.

Sampling hedonic objects versus social entities. How could these findings be explained psychologically? Why does a model that nicely explains the “attitude toward beans” in Fazio et al.’s (2004) study not provide a viable account of teachers’ behavior in the VSC? – Although we are still lacking an ultimate answer to this intriguing question, a number of plausible assumptions suggest themselves to be tested in future research. In the Fazio et al. (2004) paradigm, there are plenty of beans that are unlikely to have any complex “personality structure” that is comparable to teachers’ theory of mind or implicit personality theory. The individual bean is worth nothing; each bean can be replaced by another bean with the same energy value. There is no ethical or epistemic norm that forces organisms to treat all beans alike. As the “character” of beans is restricted to one dimension, their energy value, there is little reason to assume that several observations of the same specific beans should result in greatly different payoff. In this context, it makes perfect sense that participants (a) quickly classify beans as positive versus negative, (b) radically stop choosing the negative ones and (c) to also exclude their neighbors, and (d) never return to beans with a minimal probability of producing negative feedback. Moreover, (e) epistemic interest in the systematic evaluation of all beans is equally irrelevant as ethical concerns about justice and the beans’ potential for improvement.

In contrast, the targets that teachers’ in the VSC are facing represent complex and multidimensional animate beings with multiple motives and a high plasticity of behavior, creating the potential for high variation in performance. As a consequence, teachers (a) may not form strong and extreme initial impressions from a students’ initial one or two answers and (b) not stop considering a student after a few failures. Ethical and legal norms prohibit teachers from (c) discrimination against neighbors of low-performing students, and the standard pedagogical theory of mind allows for improvement through learning and therefore (d) calls for re-sampling of formerly disappointing students after some time, or in different lessons. Last but not least, the teachers’ responsible role obliges them to the epistemic and ethical criteria of fair and diagnostically valid evaluation of all students.

In such a sampling environment, to be sure, it is no wonder that teachers start with equally neutral priors for all students and only gradually develop pronounces attitudes. They will therefore not adhere to extreme negative anchors resulting from one or two initial observations, and fail to correct for those anchors due to radical exclusion of unpleasant target objects. Rather than being misled by uncorrected initial extreme anchors, teachers will continuously update their very flat spectrum of student attitudes in the light of student performance samples. In spite of the norm to be fair and equally interested in each student, there will be distinct variation in sample size (due to students' active impact on the sampling process) and the assessment of existing performance differences will be more pronounced for large than for small samples. To the extent that motivational factors let teachers sample more correct answers from smart students than incorrect answers from poor students, the assessment will be more accurate for positive than negative information, much in line with the model proposed by Fazio et al. (2004) and Denrell (2006). However, crucially, and contrary to this particular sampling model, the valence asymmetry will not reflect the failure to moderate too extreme attitudes against weak students but the selective polarization of initially neutral attitudes toward smart students, which become more extreme with extreme sample size.

Concluding Remarks

Much in the spirit of Mead's (1934) and Goffman's (1966) symbolic interactionism, truly social explanations of behavior have to take the rules of interpersonal and ecological "sampling games" into account. The highly interactive and institutionalized process through which teachers interact with their students are presumably quite distinct from the process by which insects search for food, or consumers select providers in the Internet. Neither the protagonists intrapsychic states (wishes, goals, capacity constraints) nor any formal sampling rules derived from normative statistics can provide a sufficient explanation of the emergent inter-personal processes that strongly determine judgments and decisions in specific environments. Kahneman and Miller’s norm theory (1986) suggests that judgments of other people or outgroups will be typically based on sampling from distributions of many other comparison persons or groups. Judgments of oneself or one’s ingroup, in contrast, draw from distributions of one’s own behavior across different situations or points in time. These different stimulus inputs resulting from these sampling games can then account for such phenomena as the actor-observer bias (Watson, 1982). In a similar vein, construal level theory tells us that more abstract units of information will be samples from distant than from proximal vantage points (Trope & Liberman 2010). Whereas teachers sample information about specific students in specific subject matters with reference to particular knowledge questions, educational politicians are mainly interested in differences between entire classes, disciplines, and school systems. The very samples obtained at different levels of aggregation may highlight and actually justify different inferences. Whereas gender stereotypes (e.g., male superiority in science) may be visible at the level of school system (due to mainly male participation in scientific elite schools), these differences may not exist at the level of individual students within the same class (cf. Fiedler, Freytag & Meiser, 2009; Fiedler et al., 2007).

The aim of the present chapter was to point out the explanatory potential of games and emergent processes that are detached from the attributes of individual persons. To illustrate these extra-personal sources of psychological theorizing, I have outlined the basic idea of so-called sampling theories (cf. Fiedler & Juslin, 2006), as illustrated in a growing body of findings obtained in an intriguing research environment, the virtual school class (VSC). The intention here was not to argue that sampling biases always override motivational or cognitive-reasoning biases, or that the latter are irrelevant or of minor importance. Denying the existence and importance of these intrapsychic sources of irrationality, stereotyping and prejudiced attitudes would be completely off the place. However, the purpose was to highlight the existence of another class of explanatory constructs which have been sorely neglected in previous research, even in those social paradigms that pretend to go beyond individuals as units of theoretical analysis.

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Table 1:

Mean correlations (computed within teachers across students) between over- and under-estimations (deviation scores) of ability and motivation across three sessions

Correlations (Deviation Scores)	**Ability Session 1**	**Motivation Session 2**	**Ability Session 2**	**Motivation Session 3**	**Ability Session 3**
Motivation Session 1	.30	.65	.30	.69	.36
Ability Session 1	----	.32	.39	.34	.48

Figure 1:

Screenshot of virtual school classroom setting

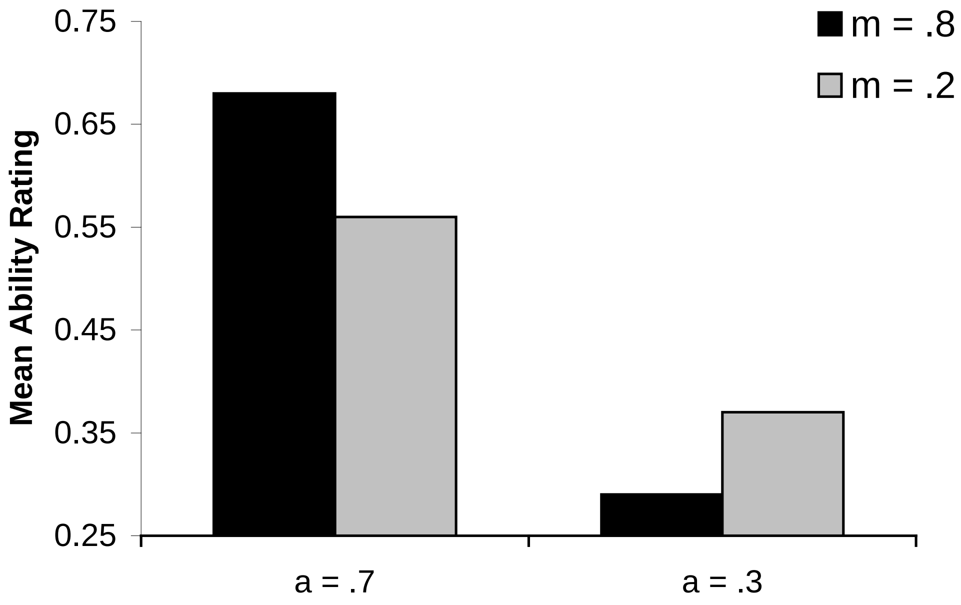

Figure 2:

Teachers' ability rating as a function of students' ability (a = .7 vs. .3) and motivation (m = .8 vs. .2)

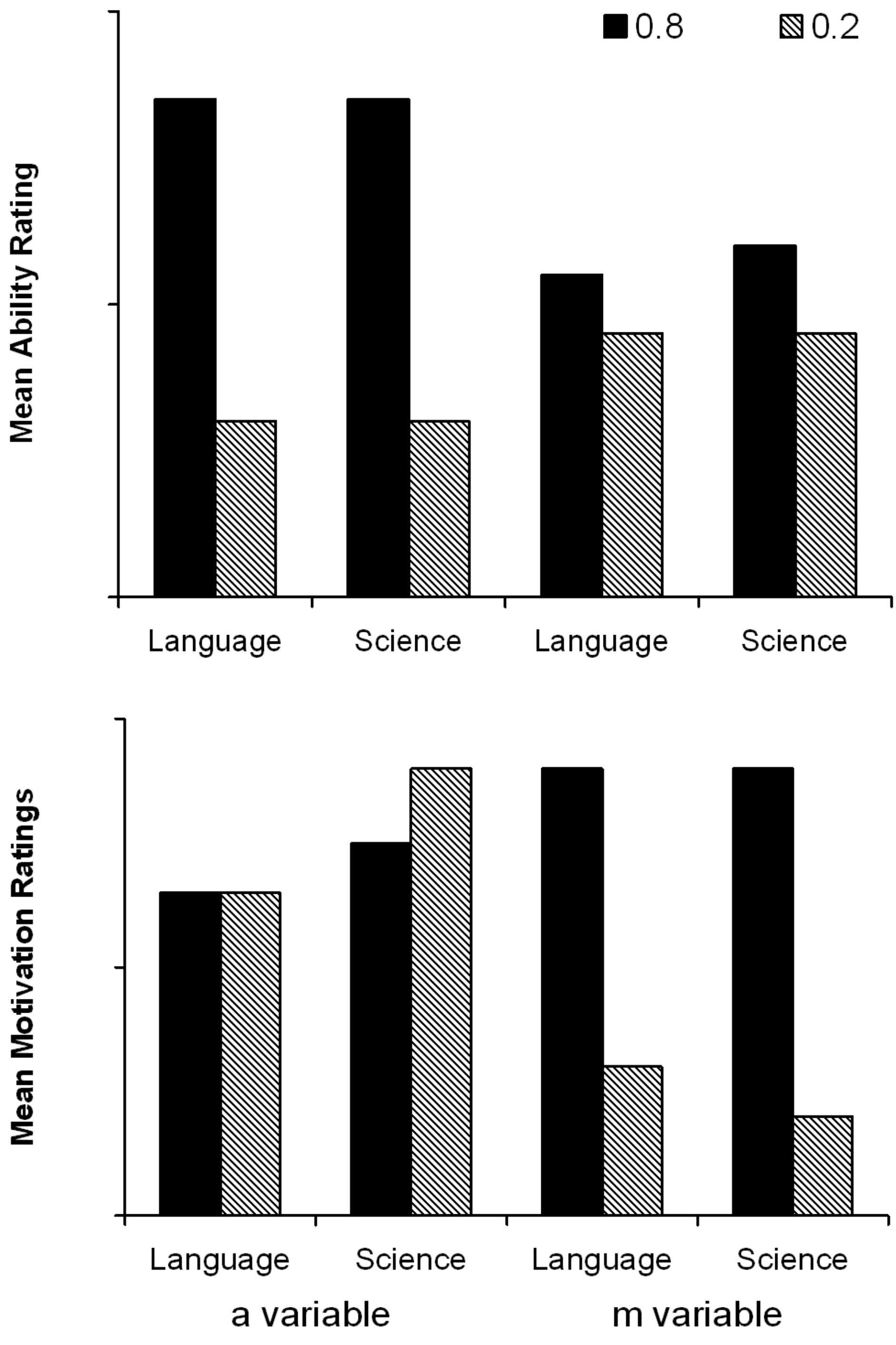

Figure 3:

Mean ratings of ability and motivation as a function of whether student performance differences (.8 vs. .2) are due to ability (a variable) or motivation (m variable)