sociological science

Supplement to:

Tutić, Andreas, and Sascha Grehl. 2018. "Status Characteristics and the Provision of Public Goods: Experimental Evidence" Sociological Science 5: 1-20.

Appendix

In the appendix, we provide a primer on the graph-theoretic account of SCT, a formal description of our version of the volunteer's timing dilemma (VTD), present additional analyses regarding a potential bias in the diffuse treatment, list the questions used in the quiz, and add the written instruction for the VTD. Note, that both the quiz as well as the instruction are translated from German language.

Graph-theoretic account of SCT

Elementary status situations. Even though SCT is in principle capable of dealing with any number of status characteristics, in our experiment the number of salient characteristics is limited to only one in every treatment. Hence, in this exposition of SCT we can restrict ourselves to so-called elementary status situations in which actors are either discriminated by one diffuse or by one specific status characteristic. The initial structure of these situations is depicted in figure 1.

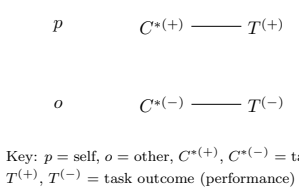
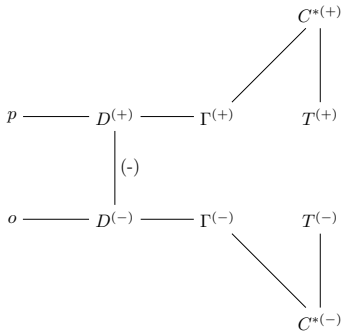


Figure 1: Graphic representation of the initial structure.

There are two actors, p and o. Importantly, the task situation is always described and hence diagrammed from the perspective of p. This means that SCT is a subjectivistic theory in the sense that it assumes that actors behave in interaction situations on the basis of their subjective definition of the situation. In principle, the definition of the situation might differ between p and o (for instance, o might not define the situation as a task situation at all). T refers to task outcomes; $T^{(+)}$ denotes success in the group task, $T^{(-)}$ denotes failure. C^* refers to a characteristic of the actors that is of high instrumental value for accomplishing the group task successfully.[1] $C^{*(+)}$ depicts a high amount of this instrumental characteristic; $C^{*(-)}$ depicts a low amount of this instrumental characteristic.

Status organizing process. In this initial task situation p is assumed to not only be oriented towards the group task but also to be taking the potential contributions of o into account. Therefore p will be searching for information regarding characteristics of o and will organize this information in a coherent manner. The main theoretical idea of SCT is that any status characteristic of p and o, which is not explicitly dissociated from the group task, will serve as a basis for forming

[1] With respect to problems of collective action, Simpson et al. (2012) argue that one characteristic is highly instrumental for success in the group task: "This is the characteristic of taking a proactive rather than reactive stance toward the achievement of the collectively valued outcome." (Simpson et al. 2012: p. 153)



Key: p = self, o = other, $D^{(+)}$, $D^{(-)}$ = positively and negatively valued states of a diffuse status characteristic, $\Gamma^{(+)}$, $\Gamma^{(-)}$ = generalized expectation state, $C^{*(+)}$, $C^{*(-)}$ = task ability, $T^{(+)}$, $T^{(-)}$ = task outcome (performance) states.

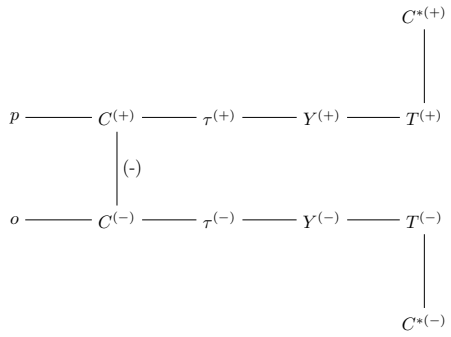
Figure 2: Graphic representation of two actors differentiated by a diffuse status characteristic.

expectations. SCT captures these tendencies by completing the graph-theoretic representation of the initial task situation. Since we are only dealing with elementary status situations, only two cases have to be taken into consideration. First, if p observes that she differs from o in terms of a diffuse status characteristic, this diffuse characteristic will become salient and the initial graph is completed as depicted in figure 2 (we assume that p possesses the positively evaluated state of the diffuse characteristic).

Here D refers to a diffuse characteristic; $D^{(+)}$ denotes the positively evaluated state of the characteristic and $D^{(-)}$ denotes the negatively evaluated state of the characteristic. As long as D is not dissociated from the group task, D will get connected to T via the so-called burden of proof process (see Berger et al. 1977: pp. 108). That is, attached to D is a generalized expectation state Γ which in turn gets cognitively connected to the instrumental characteristic C^*. In the second possible scenario, p observes that she differs from o in terms of a specific characteristic (and this characteristic is not identical to C^*). In this case this specific characteristic will become salient and the initial graph is completed as depicted in figure 3 (again we assume that p possesses the positively evaluated state of the specific characteristic).

Here C refers to a specific characteristic and the usual sign-evaluation relationship applies. C serves as a cognitive basis for inferring to success and failure at a specific task τ which connects with the abstract task ability Y. Crucially, unlike Γ which connects only indirectly to T via the instrumental characteristic C^*, Y connects directly to T.

Complete graphs in elementary status situations either look like figure 2 or figure 3, depending on the discriminating status characteristic. SCT now claims that the relative position of p to o in the power and prestige hierarchy is a function of p's expectation advantage over o. The expectation of p depends on the number of paths, the lengths and the algebraic signs of these paths that connect her to



Key: p = self, o = other, $C^{(+)}$, $C^{(-)}$ = positively and negatively valued states of a specific status characteristic, $\tau^{(+)}$, $\tau^{(-)}$ = specific task outcome states, $Y^{(+)}$, $Y^{(-)}$ = abstract task ability, $T^{(+)}$, $T^{(-)}$ = task outcome (performance) states, $C^{*(+)}$, $C^{*(-)}$ = task ability.

Figure 3: Graphic representation of two actors differentiated by a specific status characteristic.

task outcomes. An increase in number of positive paths and a decrease in length of these paths comes with a rise in expectation of p. An increase in number of negative paths and a decrease in length of these paths comes with a drop in expectation of p. Since in both figure 2 and figure 3 p is connected to task outcomes via two paths of length 4 and 5, respectively, SCT predicts that p's expectation advantage over o is identical in both situations.

The reformulated version of SCT. Simpson and Walker (2002) argue that the graph completion process in case of discrimination on basis of diffuse status characteristics is inconsistent with basic concepts of SCT. According to Berger et al. (1977: p. 97) generalized expectation states "[. . .] represent conceptions of relative capacity and incapacity, relative performance superiority and inferiority [. . .]", whereas abstract task ability refers to the state of doing well or poorly at tasks (Berger et al. 1977: p. 98). Against the background of these definitions, Simpson and Walker (2002) point out that Γ as well as Y refer to performance and not to ability and hence both should be directly connected to task outcome states T.

Following this line of reasoning, figure 2 has to be modified such that Γ is either directly connected to T and indirectly to C^* or directly connected to both T and C^*. Either way, the reformulated version of SCT now predicts that diffuse status characteristics have a greater impact than specific status characteristics, since the paths connecting actors and outcomes are in the former case shorter than in the latter.

Additional analyses

Here we present additional empirical analyses of our data concerning the potential bias in our diffuse treatment. Recall, models (2) and (3) as well as models (5) and (6) of table **??** already indicate that neither the rate nor the pace of contribution is correlated with subjective social status. In fact, our design enables us

to estimate the effect of subjective social status on rate and pace of contributions net of the performance expectation effect by calculating the bivariate association between subjective status and rate and pace over the random and the specific treatment. Both of these associations are very small and in fact insignificant (see table 1). Hence, we are confident to assert that the effects of status groups in the diffuse treatment reflect performance expectations to an overwhelming extent.

contribution ...	*rate (odds ratios)*	*pace (in sec)*
	(7)	(8)
Subjective social status [1–10]	0.905	0.924
	(0.076)	(0.937)
Constant	1.182	32.168**
	(0.692)	(6.587)
Observations	1740	1740

Note: Standard errors in parentheses. $^{+}p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Table 1: Random effects logit (for contribution probability) and random effects linear (for contribution pace) regressions for the random and specific treatment only.

Volunteer's timing dilemma

Let the strategy set of a player $i \in N = \{1, \ldots, 4\}$ be $S_i = [0, 60] \cap \{\tau\}$, whereby we identify τ with a number greater than 60. For $s = (s_1, \ldots, s_4) \in S$ let $\bar{s} = (\bar{s}_a, \ldots, \bar{s}_d)$ be a non-decreasing order of s, i.e., a bijection $\eta : \{1, \ldots, 4\} \to \{a, \ldots, d\}$, such that $s_i = \bar{s}_{\eta(i)}$ for all $i = 1, \ldots, 4$ and $\bar{s}_a \leq \cdots \leq \bar{s}_d$. Moreover let $t(s) := \bar{s}_b$. Then the payoff function of player $i \in N$ is the following:

$$\pi_i(s_i, s_{-i}) = \begin{cases} -40 - t(s) & , s_i \leq t(s) < \tau, \\ -t(s) & , s_i > t(s) < \tau, \\ -100 & , s_i = t(s) = \tau, \\ -140 & , s_i < t(s) = \tau. \end{cases}$$

The first term represents the payoff of subject i if i and another group member j volunteer, whereby i volunteers faster or at least as fast as j. The second term refers to the situation in which again subject i and another group member j volunteer, but this time i is slower than j. Term three describes the situation in which subject i does not volunteer and not more than one other subject volunteers. Finally, the last term refers to the situation where subject i is the only one in the group who volunteers. Note, that in our VTD subjects could only lose money, however they got enough money in advance to cover these potential losses.

Quiz

The quiz consists of five question sets each concerning a different type of game. Prior to each question set a short text presented the game and introduced central concepts of game theory such as dominance, best response, and the pure Nash-equilibrium. In the following we present the five games and question sets:

(payoff)		Co-player	
		wait	walk around
You	wait	1,1	0,0
	walk around	0,0	0,0

1) If you choose the strategy *walk around* and your co-player the strategy *wait*, what payoff do you get?
2) Does strategy *wait* also dominate strategy *walk around* for the co-player?
3) Is the strategy *walk around* a best response to the strategy *wait*?
4) How many equilibria does the above game have?

(years in prison)		Prisoner B	
		silent	confess
Prisoner A	silent	2,2	10,0
	confess	0,10	6,6

5) If prisoner A choose *silence* and prisoner B *confess*, how many years prisoner does B have to go to prison?
6) Is the strategy *silence* a best response to the strategy *confess*?
7) How many equilibria does the above game have?

(payoff)		Hunter B	
		stag	hare
Hunter A	stag	3,3	0,1
	hare	1,0	1,1

8) What is the payoff for hunter A if both hunters choose the strategy *hare*?
9) Does one strategy dominate the other strategy?
10) How many equilibria does the above game have?

(payoff)		Player B	
		swerve	straight
Player A	swerve	3,3	2,4
	straight	4,2	1,1

11) Which of the following statements are correct? (*swerve* dominates *straight*; *straight* dominates *swerve*; no strategy dominates the other)
12) Is *swerve* a best response to *swerve*?
13) How many equilibria does the above game have?

(payoff)		Man	
		political event	cinema
Woman	political event	4,3	2,2
	cinema	1,1	3,4

14) Which payoff does the man get if he finds himself alone in the cinema?
15) Which of the following statements are correct? (*political event* dominates *cinema*; *cinema* dominates *political event*; no strategy dominates the other)

Written instruction for the decision making game

For this part of the study you will be paired up with three other participants. Each of the groups is composed of two stars and two non-stars. You will be performing over several rounds and in each round the groups will be randomly composed anew.

Each participant has to abide by the following rules.

One round lasts at maximum 60 seconds. For each lasting second of the game one cent of each group member's credit will be deducted. The duration of the game depends upon the group members' decision making.

During each round each group member has the opportunity of voluntarily giving up 40 cent of their own credit (option A). In case one member does choose option A, 40 cent will be deducted of his or her credit. This loss is independent from the costs that are caused by the duration of the game. Choosing option B does not result in any direct costs.

As soon as two (or more) participants have decided on option A the round comes to an end. In case none or only one of the participants chooses option A, 40 cent will be deducted from each group members account in addition to the 60 cent caused by the duration of the game.

By clicking on one of the buttons on the computer screen you can either choose option A or B. If you have not chosen either of the two options by the end of the round, the computer will automatically allot you to option B.

Example 1: 5 seconds after the game has started you decide on option A, another group member does the same after 15 seconds have passed. You and the other acting group member lose 40+15=55 cent. The two other group members lose 15 cent.

Example 2: 30 seconds after the game has started you decide on option A, but nobody else opts for the same. In this case you lose 40 cent for choosing option A and you lose 1 additional Euro since not enough other group members have chosen option A. The three remaining group members lose 1 Euro.

Example 3: You decide on option B. One group member chooses option A after 1 second and another group member chooses option A after 10 seconds. In this case 10 cent will be deducted from your account.

Example 4: You decide on option B. Only one other group member chooses option A and does so after 40 seconds. In this case 1 Euro will be deducted from your account.

In the following, you will be playing one round of practice during which all losses will be fictional. Take this chance in order to get used to the handling.

References

Berger, Joseph, M. Hamit Fisek, Robert Zane Norman, and Morris Zelditch, Jr. 1977. *Status Characteristics and Social Interaction: An Expectation-States Approach*. New York: Elsevier.

Simpson, Brent and Henry A. Walker. 2002. "Status Characteristics and Performance Expectations: A Reformulation." *Sociological Theory* 20:24–40.

Simpson, Brent, Robb Willer, and Cecilia L. Ridgeway. 2012. "Status Hierarchies and the Organization of Collective Action." *Sociological Theory* 30:149–166.