



**WORKER RECIPROCITY AND THE RETURNS TO TRAINING:
EVIDENCE FROM A FIELD EXPERIMENT****Jan Sauerman¹****Institute for Evaluation of Labour Market and Education Policy (IFAU),
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Abstract

Is there a correlation between reciprocal workers and higher returns to employer-sponsored training? The study employed a field experiment that utilized random assignment to training, along with the collection of survey data on workers' reciprocal tendencies. The findings of the study indicate that workers who exhibit reciprocal behavior are more likely to reciprocate their employers' expenditures in training by demonstrating higher levels of performance after completing the training program. The findings of this study remain consistent even after accounting for observed personality traits and worker-fixed effects. These results indicate that individuals respond to the firm's investment in human capital by exerting greater effort, aligning with theoretical models that propose a reciprocal relationship between gift exchange in the workplace. This discovery offers an alternate justification for corporate training investments, notwithstanding the potential danger of employee poaching.

Keywords: Reciprocity, Returns, Training, Worker



INTRODUCTION

The topic of training has garnered significant attention from policymakers and corporations in labor markets that face challenges stemming from globalization and technological advancements. According to the Organization for Economic Co-operation and Development (OECD, 2017), around 70% of employees in the United States participate in work-related training and education programs. Firms frequently bear the expenses associated with training investments, either through direct financing of training courses or indirectly by providing training during work hours (Leuven & Oosterbeek, 1999). The rationale behind employers' decision to spend on training despite the potential danger of employee poaching is sometimes attributed to market imperfections, namely the existence of compressed wages (Acemoglu & Pischke, 1998, 1999). An alternative perspective can be found in the concept of reciprocity, wherein employees may be motivated to reciprocate employer investments through actions such as decreasing turnover rates, exerting greater effort, or moderating salary demands (Leuven et al., 2005; Non, 2020). Reciprocating training investment thus functions as a behavioral rationale for the decision of firms to allocate resources towards training initiatives.

This study examines the relationship between favorably reciprocal individuals and their response to training investments. Specifically, it investigates whether these workers exert additional effort after participating in firm-sponsored training, leading to improved post-training performance. The study aims to examine the relationship between reciprocity and higher training returns by analyzing data obtained from actual measurements of



worker performance. The data was taken from an in-house call center operated by a multinational mobile network provider in the Netherlands. In this study, I utilize the random assignment of workers to a training program within a corporation as a means to assess the causal effects of training on returns.

The article referenced is an open-access publication governed by the Creative Commons Attribution “Non-Commercial” No Derivs License. This license allows for the use and distribution of the original work in any medium, provided proper citation is given, the use is non-commercial, and no modifications or adaptations are made (De Grip & Sauermann, 2012). One possible way to rewrite the user’s text to be more academic is as follows: “In support of the notion that the firm’s offering of a comprehensive, fully-funded week-long training program can be interpreted as a favorable gesture towards employees, I present evidence indicating that individuals with higher levels of reciprocity exhibit greater benefits from the training program. Specifically, these individuals demonstrate superior performance following the training compared to those with lower reciprocal inclinations. This phenomenon cannot be accounted for by alternative personality measures that have been observed, nor can it be explained by adjusting for individual-specific effects that have not been directly observed. What is the significance of reciprocal tendencies in the context of job training? The act of rewarding (positive reciprocity) or punishing (negative reciprocity) is directly associated with the satisfaction individuals derive, regardless of any immediate pecuniary gain, as evidenced by studies conducted by Falk and Fischbacher (2006) and Rabin (1993). Numerous



empirical investigations employing laboratory and field tests have consistently demonstrated that the provision of gifts by employers elicits a heightened level of effort from workers, beyond the effort they would typically exert in the absence of such incentives. The user's text does not provide enough information to be rewritten in an academic manner. The majority of these research examine the impact of a randomized intervention, specifically a monetary or nonmonetary incentive, on individuals' level of effort exertion. This approach enables the establishing of a causal relationship between the magnitude and nature of the incentive and an individual's reaction to it.

There is a limited number of research that employ explicit measurements of reciprocal attitudes obtained through experiments or questionnaires, along with worker- and firm-level results. In their study, Barr and Serneels (2009) employ experimentally generated indicators of workers' reciprocal attitudes and company performance measures to investigate the relationship between workforce reciprocity and business productivity. Their findings reveal that organizations characterized by a higher degree of reciprocity among employees tend to exhibit greater levels of productivity compared to firms with a lower degree of reciprocity. According to the findings of Cohn et al. (2015), it is evident that a rise in hourly earnings, which occurs unexpectedly, leads to enhanced performance exclusively among individuals who exhibited reciprocal attitudes in a choice experiment. When doing research in settings where experiments are impractical or unattainable, the utilization of survey questions pertaining to reciprocity in extensive surveys enables the examination of the significance



of reciprocity in relation to labor market outcomes (Perugini et al., 2003). Englmaier and Leider (2020) present empirical findings drawn from a field experiment, indicating that persons with elevated (depressed) levels of reciprocal tendencies, ascertained by personality assessments, predominantly manifest affirmative reactions to higher (lower) salary offers. Dohmen et al. (2009) demonstrate a positive correlation between workers' reciprocal attitudes and both better salaries and increased working hours, based on a comprehensive sample of individuals in Germany.

The provision of training opportunities might be regarded as a strategy employed by corporations to elicit reciprocal responses. The aforementioned responses may be elicited either due to the perception of the training as a valuable resource (for instance, if the training is of a broad scope and can enhance alternative opportunities) or due to the perception of the training as a kind of recognition from the manager (Dur, 2009). According to the findings of Leuven et al. (2005), employers are motivated to offer training at levels that align with social optimality when they consider workers' reciprocal tendencies, thus mitigating the holdup problem. In their study, Leuven et al. (2005) utilize cross-sectional data from the Netherlands to present empirical findings indicating that persons with higher levels of reciprocal inclinations are more inclined to engage in employer-funded training programs compared to individuals with lower levels of reciprocal inclinations. According to Non (2020), there is supportive evidence indicating that persons who engage in reciprocal behavior are more inclined to participate in training activities in Germany. While it is possible that the observed association may be a result of unintentional sorting of persons



with reciprocal tendencies into training firms, it is also consistent with the concept of strategic selection by firms to provide reciprocal incentives (Englmaier & Leider, 2012). Englmaier et al. (2016) provide empirical evidence supporting the notion that companies who incorporate personality testing into their hiring processes demonstrate a higher propensity to provide on-the-job training, along with other advantageous outcomes. Non (2020) argues that the concept of reciprocity is significant in the context of training in flexible labor markets. This implies that employers strategically utilize training programs as a way to develop gift-exchange relationships with their employees. The user's text is too short to be rewritten academically.

The current study used a randomized approach to assess the impact of participating in a training program on performance. This methodology enables the evaluation of both the direct causal effect of training participation on performance, as well as the indirect effect resulting from the interaction between the training effect and the reciprocal attitudes of the workers. This not only provides an explanation for the positive relationship between the frequency of training and reciprocal attitudes, as demonstrated by Leuven et al. (2005) and Non (2020), but also enhances our overall comprehension of firm investments in employee human capital by presenting an alternative justification for such investments, even in the presence of poaching risks. This alternative rationale is supported by the works of Acemoglu and Pischke (1999), Caliendo et al. (2021), Hoffman and Burks (2017), and Leuven and Oosterbeek (1999). This research further enhances the existing body of literature by examining the processes via



which reciprocity may impact the outcomes of training. The concept of reciprocity may have implications for the outcomes of training programs, as it might potentially influence the level of effort exerted by individuals after completing the training. Additionally, reciprocity may also play a role in enhancing the effectiveness of human capital acquisition during the training process. The analysis of mechanisms that are anticipated to result in more efficient acquisition of human capital holds significant implications for corporate investment in training, since it is expected to have more stable long-term impacts.

This study is a valuable contribution to the existing body of literature concerning the benefits of workplace training, the influence of personality traits in the labor market, and the role of personality in the variation observed in predicted returns to training. The scholarly discourse surrounding training returns has extensively examined the challenge of establishing causal relationships in estimated returns to training. This issue has primarily been tackled through fixed-effects methodologies utilizing observational data, and to a lesser extent, through the utilization of experimental variation. Notable contributions to this discourse include the works of Adhvaryu et al. (2018), De Grip and Sauermann (2012), Prada et al. (2019), and Schwerdt et al. (2012). Simultaneously, an increasing number of research indicate that personality traits include predictive capabilities in relation to several parameters, including but not limited to educational decisions, job exploration, employment outcomes, and income levels. In addition to reciprocity, various examples can be found in the literature. One such example is the Big Five personality traits, which have been extensively



studied by researchers such as Bowles et al. (2001), Gensowski (2018), and Mueller & Plug (2006). These traits are assessed through survey-based measures and encompass factors related to openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. Another example is the locus of control, which is measured through surveys and reflects individuals' beliefs regarding the extent of control they have over outcomes in their lives. Studies by Caliendo et al. (2015, 2021) have explored this concept in depth. In the realm of training, Offer Haus (2013) discovered that the Big Five personality traits do not have a significant impact on individuals' engagement in training activities, based on a representative sample from Germany. Conversely, Caliendo et al. (2021) report empirical findings indicating that individuals with a stronger internal locus of control exhibit greater rates of participation in general training programs. The user's text is too short to be rewritten in an academic manner. To the best of my understanding, this research represents a pioneering effort since it combines objective and repeated (panel) data on worker performance with survey data on personality measures. This unique approach enables an examination of the impact of personality traits on the outcomes of training programs.

This paper will be structured as follows. Section 2 provides a comprehensive account of the data, the field experiment, and the metrics employed to assess reciprocity. The primary findings, along with the conducted tests for reliability, are given and analyzed in Section 3. Section 4 of the document presents supplementary findings and supporting material pertaining to the underlying mechanisms. Section 5 provides a summary and draws conclusions.

**LITERATURE REVIEW****Workplace, tasks, and performance measurement**

The field experiment exploited in this study was organized in the in-house call center of a multinational mobile network operator in the Netherlands from weeks 45/2008 to 24/2009. This call center acts as a service center for current and prospective customers. I focus on the largest department, which serves only private customers with fixed cell phone contracts. Call agents in this department have only one task, to answer incoming customer phone calls, for example, when customers have problems, complaints, or questions. Agents in this department are not involved in sales or customer acquisition. All agents take part in a training course when entering the department, which enables them to handle basic types of calls. Throughout their careers, agents regularly participate in training programs, which typically focus on learning about promotional campaigns, improving communication and information technology (IT) skills, as well as learning how to handle more complex calls.

Call agents are organized into 13 teams, each of which is led by a team leader. In each week, an average of nine agents works in each team. The main purpose of being assigned to a team leader is that workers can be more efficiently supervised and monitored. There is no team specialization, team production, nor team-based incentives. Calls are typically queued before they are assigned to an available agent, irrespective of the agent's team membership. Although the firm collects large amounts of data on the performance of individual call agents, these are not explicitly used to incentivize the call agents. Agents' performance



can influence wages only through an annual appraisal interview with their team leader in which agents are evaluated for the past year. On the basis of the outcome of this appraisal interview, agents receive an annual bonus as well as an annual wage increase. Otherwise, wages are fixed for agents. The data contain weekly information on performance outcomes, with average handling time being the most important measure for monitoring agent performance used in the firm. Average handling time is defined as the average time an agent needs to handle a customer call. This information is available for each individual agent and each working week. I use the inverse of average handling time multiplied by 100, which allows us to interpret high y as high performance. This performance outcome is observed for each week and each worker throughout the sample period.

The Field Experiment

Within the department under investigation, the management implemented a novel training program with the specific objective of reducing the mean duration required to handle incoming calls. The training program was structured to span a duration of one week, taking place within the call center's dedicated training facility. The program was conducted over a period of five consecutive days, commencing on Monday and concluding on Friday. The call agents received remuneration equivalent to a full-time salary throughout the training week. Approximately 50% of the allocated training duration was dedicated to collective deliberations, during which the participants engaged in conversations pertaining to the deficiencies in their respective task-related competencies. These dialogues primarily revolved



around strategies for enhancing these competencies and exploring avenues for fostering greater mutual assistance among the agents. During the remaining portion of the training period, coaching personnel provided support to agents in managing consumer calls.

The sample period, lasting 32 weeks, spans from week 45 of 2008 to week 24 of 2009. It can be divided into three distinct periods: a pretraining phase, which encompasses weeks 45 of 2008 to 9 of 2009; a training period, which covers weeks 10 to 14 of 2009; and a post training period, which extends from weeks 15 to 24 of 2009. In the pretraining phase, specifically in week 50 of the year 2008, a total of 157 agents were considered for involvement in the field experiment. Out of these, 74 agents were ultimately chosen to take part. The group, which was not picked randomly, was then assigned in a random manner to both treatment and control groups. The numerical value provided by the user is 8. As a result of a limitation that restricted the training of no more than 10 agents concurrently, the teams were additionally divided into several training groups by a random allocation process. In total, a cohort of 34 agents underwent training over the designated training period. The control group consisted of 40 agents who underwent training starting from week 25/2009, which corresponds to the week immediately following the conclusion of the sample period analyzed in this study.

The utilization of survey data pertaining to reciprocity and other individual-specific attributes is employed at the commencement of the training program. As a result of incomplete survey responses, the sample size utilized in this study is reduced to $N = 63$, comprising of 30 individuals



in the treatment group and 33 individuals in the control group. According to the data presented in Column (4) of Table 1, the observable features of individuals in the treatment and control groups are evenly distributed. The number 9. The significance threshold of 10% reveals that there is a meaningful difference between the treatment and control groups for only one of the characteristics of the Big Five measurements, specifically extraversion. In general, this analysis demonstrates that both socioeconomic attributes and personality traits are evenly distributed between the treatment and control groups. Furthermore, it suggests that the treatment can be regarded as exogenous, given that participation in the field trial is the only requirement for assignment.

The first column of Table 1 presents descriptive statistics for the sample used in the field experiment. The prevailing demographic among agents consists of women, comprising around 70% of the total population. On average, these agents are 36 years of age. The agents in question exhibit an average duration of employment of 4.2 years and engage in part-time work, dedicating an average of 17 hours per week to their professional responsibilities.

Why this setting is Useful for Studying Reciprocal Behavior

There exist three key factors that contribute to the utility of this field experiment in investigating the extent to which workers engage in reciprocal behavior in response to the firm's investments in training. The utilization of random assignment in allocating agents to treatment and control groups establishes a framework that facilitates the evaluation of the causal impact of the training program on performance, along with its



interaction with the measure of reciprocity. A salient characteristic of this study is that participants in both the experimental and control groups underwent training at some point and were consistently informed about the future training. The estimations are determined solely based on data collected prior to the training of the control group. In other words, the impact of reciprocity is determined by examining the diversity in training investment timing within individual workers. Prior to the commencement of training for the agents in the control group, a period of observation spanning several weeks is conducted for the agents in the treatment group following their participation in the training program. The aforementioned scenario possesses two significant consequences for the interpretation of outcomes. Initially, it should be noted that the agents were not provided with information regarding the randomization process or the subsequent evaluation. However, the management did convey that the training would be implemented gradually over a span of many months, citing limitations in the training center's capacity as the reason for this approach. Due to this rationale, it is improbable that agents in the control group saw the training received by the treatment group as inequitable. Furthermore, it should be noted that the estimates obtained from the control group may underestimate the actual impact of the interaction between training and reciprocity due to the agents' ability to monitor or predict the employer's investment. The number 10. Furthermore, as part of the training program, the agents received their regular full-time salary and were relocated from their typical work setting to a dedicated training center that was physically segregated from the work floor. The findings of an internal post-training



assessment questionnaire administered by management indicate that the agents had a favorable and enjoyable experience during the training. The agents' collective evaluation yields a mean grade of 8.1 on a rating scale ranging from 1 (representing the lowest rating) to 10 (representing the highest rating). Furthermore, a significant majority of 84% of the respondents expressed strong agreement with the assertion that the investment in training was really worthwhile. The number 11 This finding indicates that the agents' perception of the training was favorable, viewing it as a proactive measure taken by the organization rather than a burdensome task.

The primary theoretical rationale underlying this study posits that employees may interpret training programs as a form of benefaction, particularly when the training is of a broad and inclusive type. While the training material does include certain aspects specific to the company, such as knowledge pertaining to its IT infrastructure, there are also skills, like effective customer communication, that can be considered more universal and applicable to other call centers in close proximity, of which there are numerous. The impact of reciprocity is expected to be more pronounced when the training program has a greater degree of genetic material.

Measuring Reciprocity, Personality, and Cognitive Skills

During the conducted field experiment, individuals working as call agents were included in a survey that focused on the topic of "working in call centers". This survey encompassed several aspects such as reciprocal attitudes, personality assessments, inquiries aimed at eliciting cognitive test scores, and questions pertaining to socio-economic characteristics that were



not included in the personnel data of the organization. Data on reciprocity at the individual level was collected using a set of questions that were designed and empirically confirmed by Perugini et al. (2003). These questions, for instance, are being utilized in the German Socioeconomic Panel (GSOEP; Dohmen et al., 2009). In the conducted survey, participants were requested to evaluate six inquiries using a Likert scale consisting of five points, ranging from 1 (does not apply to me at all) to 5 (applies perfectly to me). Among these questions, three were utilized to compute a metric pertaining to positive reciprocity. The number 12. Reciprocity measurements that are derived from a descriptive perspective.

Table 1

Sample	(1) All	(2) Treat. group	(3) Control group	(4) Diff. (3) – (2)
Gender (1 = male)	0.3016 (0.4626)	0.3667 (0.4901)	0.2424 (0.4352)	-0.1242 (-1.0658)
Age	36.3504 (11.2356)	34.9622 (10.3689)	37.6125 (11.9876)	2.6503 (0.9341)
Tenure (in years)	4.1990 (3.9701)	4.4147 (3.9226)	4.0029 (4.0633)	-0.4118 (-0.4084)
High education	0.3103 (0.4667)	0.3571 (0.4880)	0.2667 (0.4498)	-0.0905 (-0.7348)
Performance	0.3629 (0.0837)	0.3673 (0.0727)	0.3589 (0.0935)	-0.0085 (-0.3985)
Number of calls	196.4127 (115.7966)	187.0000 (119.1478)	204.9697 (113.8235)	17.9697 (0.6121)
Working hours	16.6508 (8.4799)	15.9667 (9.3199)	17.2727 (7.7309)	1.3061 (0.6074)
Share peak hours	0.5328 (0.1935)	0.5386 (0.1817)	0.5276 (0.2063)	-0.0110 (-0.2242)
Absenteeism	0.1111 (0.3168)	0.1000 (0.3051)	0.1212 (0.3314)	0.0212 (0.2634)
Training incidence	0.1905 (0.3958)	0.1000 (0.3051)	0.2727 (0.4523)	0.1727 (1.7588)
Leaver	0.5238	0.5667	0.4848	-0.0818



	(0.5034)	(0.5040)	(0.5075)	(-0.6412)
Positive Reciprocity	4.2011	4.1222	4.2727	0.1505
	(0.6627)	(0.7349)	(0.5919)	(0.8989)
Positive Reciprocity (std.)	0.0118	-0.1105	0.1230	0.2335
	(1.0283)	(1.1403)	(0.9184)	(0.8989)
Conscientiousness	12.6667	12.5667	12.7576	0.1909
	(1.4142)	(1.3566)	(1.4797)	(0.5320)
Extraversion	12.0952	12.6667	11.5758	-1.0909*
	(1.8554)	(1.5388)	(1.9848)	(-2.4204)
Agreeableness	12.7619	12.5667	12.9394	0.3727
	(1.6821)	(1.8696)	(1.4987)	(0.8767)
Openness experience	10.3810	10.5333	10.2424	-0.2909
	(1.9380)	(1.9250)	(1.9690)	(-0.5919)
Neuroticism	7.2857	7.2667	7.3030	0.0364
	(2.3721)	(2.4344)	(2.3517)	(0.0603)
Cognitive score	0.4561	0.4770	0.4345	-0.0425
	(0.2450)	(0.2736)	(0.2144)	(-0.6511)
Negative reciprocity	2.4815	2.5556	2.4141	-0.1414
	(0.8875)	(0.8502)	(0.9281)	(-0.6285)
Locus of control	8.7143	8.8667	8.5758	-0.2909
	(1.5390)	(1.6132)	(1.4797)	(-0.7466)

(Continues)

	(1)	(2)	(3)	(4)
Sample	All	Treat. group	Control group	Diff. (3) - (2)
Loyalty	1.1270	1.1467	1.1091	-0.0376
	(0.7042)	(0.6453)	(0.7634)	(-0.2099)
Observations	63	30	33	63

Notes: Standard deviations are in parentheses in Columns (1)–(3); *t* statistics in Column (4). All variables are measured before the training intervention.

**p* < .10. gift exchange experiments are more reliable (e.g., Cohn et al., 2015), survey evidence on reciprocity yields results that are consistent with



theoretical predictions (Dohmen et al., 2009; Montizaan, Cörvers et al., 2015).

The distribution of positive reciprocity for the estimation sample is depicted in Figure 1, exhibiting similarities to the reciprocity distributions seen in the wider population (Dohmen et al., 2009). The determination of this distribution is presumably influenced by multiple factors. While the exact distribution of reciprocity among individuals applying for positions at this company is not yet known, it has been observed that the use of personality tests during the recruiting process may result in an overrepresentation of those who exhibit reciprocal behavior (Englmaier et al., 2016). Moreover, the inverse relationship between reciprocity and turnover will have an impact on the allocation of reciprocity throughout the organization (refer to Table 2). While the process of randomization remains unaffected by this selection, it implies that workers may exhibit a higher degree of reciprocity compared to other groups such as applicants or newly hired individuals inside the organization.

In order to examine the potential influence of individual-specific traits on the results, supplementary assessments of personality, loyalty, and cognitive skills, all obtained from the same survey, are utilized for analysis. In assessing personality traits, I employ the Big Five factors, which encompass conscientiousness, extraversion, agreeableness, openness to new experiences, and neuroticism. Additionally, I consider the locus of control, which gauges individuals' perception of their control over life outcomes, and negative reciprocity, which refers to the inclination to retaliate in response to negative encounters. The number 13. The



significance of each of these personality characteristics for labor market outcomes has been demonstrated in several studies (Bowles et al., 2001; Caliendo et al., 2015, 2021; Gensowski, 2018; Montizaan, Cörvers et al., 2015; Mueller & Plug, 2006; Offerhaus, 2013). Additional evidence or data that reinforces or substantiates a claim or argument. Table A.2 presents comprehensive data pertaining to the measurement, utilization of questions, and references associated with each of the aforementioned metrics.

Correlates of Reciprocity

Table 2 This study presents the correlation coefficients that exist between positive reciprocity and various agent-specific characteristics, personality traits, and work results. The data shown in the table indicates that there is no statistically significant association between reciprocity and agent characteristics, specifically gender, age, and education. In relation to the personality traits and survey measures presented in Column (2), it is noteworthy that only the Big Five personality measures exhibit a correlation with the measure of reciprocity. This finding aligns with the research conducted by Dohmen et al. (2008), who utilized representative survey data from Germany. The number 14. The alternative survey-oriented.

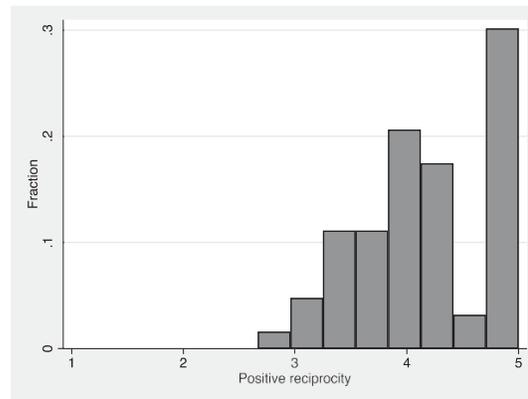


Figure 1
Distribution of Reciprocity

Notes: This figure shows the histogram of positive reciprocity for the estimation sample ($N = 63$). The underlying questions (see Section 2.4) can be answered on a scale from 1 (“does not apply to me at all”) to 5 (“applies perfectly to me”)

Table 2
Correlates of Positive Reciprocity

(1) Worker characteristics		(2) Personality measures		(3) Worker outcomes	
Gender (1 = male)	0.1104	Big Five		Performance	-0.0295
Age	-0.0124	Conscientiousness	0.4020***	Tenure	0.1515
High-skilled education	0.0929	Extraversion	0.0898	Working hours	0.0109
		Agreeableness	0.2404*	Share peak hours	0.0192
		Openness	0.2487**	Absenteeism	-0.0841
Neuroticism		Cognitive test score	0.2997**	Training	-0.0466
			0.1907	incidence Leaver	-0.2127*
Negative reciprocity			-0.0115		
Locus of control			-0.0763		
Loyalty			-0.1450		



Notes: Figures in this table show pairwise Pearson's correlation coefficients of worker characteristics with the measure of positive reciprocity (standardized). The figures are based on the estimation sample and contain one observation per agent ($N = 63$, cf. Column 1 of Table 1). All personality measures are standardized with 0 mean and standard deviation of 1. All time-varying variables in Column (3) are averaged over the time between the start of the sample (45/2008) The commencement of the field trial occurred in September 2009. Worker outcomes can be categorized and measured in the following ways: performance, which is the inverse of average handling time; tenure, which is the number of years a worker has been employed; weekly working hours; the proportion of working hours during peak hours; absenteeism, which is the proportion of weeks in which an agent reported being sick; and training incidence, which is the proportion of weeks in which an agent got training. The term "leaver" is operationally defined as an individual who voluntarily terminates their employment during a period of six months following the conclusion of the experimental study.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

The correlation between measurements such as cognitive test score, negative reciprocity, locus of control, and loyalty and reciprocity is not found to be statistically significant.

Among the various outcomes pertaining to workers, it is observed that only the variable "leaver" exhibits a correlation with the measure of



reciprocity, as indicated in Column 3 of Table 2. The variable “leaver” is defined as a binary indicator denoting whether an individual voluntarily terminates their employment during a 6-month period subsequent to the conclusion of the experiment. The number 15 is the value being discussed. Although the statistical significance of this correlation coefficient is only weak at the 10% level, its interpretation aligns with theoretical expectations. Specifically, it suggests that individuals with reciprocal tendencies may be more likely to exhibit longer tenure within the organization.

RESEARCH METHOD

This research is a field experiment, which incorporates certain controlled features of standard lab experiments but takes place in natural, real-world settings. A field experiment, unlike case studies and observational studies, nonetheless follows all of the steps of the scientific method, addressing research problems and creating hypotheses. Field research has the obvious advantage of being practical and allowing testing without artificially introducing confounding variables. Because a population biologist studying an ecosystem cannot bring the complete ecosystem into the laboratory, field experiments are the only viable research tool in many fields of science. Furthermore, they avoid the charge hurled against laboratory tests of missing external or ecological validity or negatively altering the subject’s behavior.

Social scientists and psychologists frequently employed field experiments to conduct blind studies in which the subjects were unaware that they were being observed. The Piliavin and Piliavin experiment, in which



strangers' willingness to assist blood-covered 'victims' was measured, is a good example of this. Under the philosophy of informed consent, this is now frowned upon and is only employed in rare and carefully regulated instances. Field experiments frequently lack a distinct control group and have many variables to try to eliminate. For example, if the effects of a drug are investigated and the patient is told not to drink alcohol, there is no guarantee that the subject will follow the directions, hence field studies sometimes sacrifice internal validity for external validity. This is not a problem in subjects such as biology, geology, and environmental research, and the field experiment can be viewed as a legitimate experimental procedure that follows the steps of the scientific process.

RESULTS AND DISCUSSION

Effect of Reciprocity on Returns to Training

In order to examine the correlation between reciprocal attitudes and the benefits of training, we utilize the complete panel structure of the field experiment, consisting of 63 agents. The performance of the agent is evaluated on a weekly basis, both prior to and following the training session, spanning from week 45 of 2008 to week 24 of 2009. The estimation of the causal impact of worker participation in the training program on productivity, as well as its interaction with the measure of reciprocity, can be conducted by ordinary least-squares regression due to the random assignment of agents to the training course.:

$$\log(y_{it}) = \alpha + \tau_1 d_{it} + \tau_2 rec_i + \tau_3 d_{it} \cdot rec_i + \beta_1 X_{it} + \beta_2 t_t + \beta_3 X_t + u_{it},$$



The variable y_{it} represents the productivity measure of worker during week t , which is determined by the average handling time. Higher values of y_{it} are indicative of superior performance. The variable “dummy dit ” is assigned a value of 1 for each week following the agent's participation in training. The variable “ $reci$ ” represents the survey measure of positive reciprocity. In accordance with the study conducted by De Grip and Sauermann (2012), I incorporate control factors to address any residual individual heterogeneity (X_{it}). These variables encompass several features, including whether an agent is engaged in work during peak hours characterized by a high consumer load in week t . The number provided by the user is 16. In order to account for potential influences on aggregate performance and workload, I use a linear temporal trend (tt) and the ratio of total calls to the number of full-time equivalent agents (X_t). The number provided by the user is 17. The error term, represented as uit , has distinctive characteristics and is clustered at the team level in order to accommodate for randomization that occurs at the team level. This approach is discussed in Section 2.2 and has been previously explored by Abadie et al. in 2017.

Table 3 The presented findings illustrate the outcomes obtained from the estimation of Equation (1). The data presented in Column (1) indicates that there is a causal relationship between participation in training and performance. Specifically, the effect of training participation on performance is estimated to be 0.0861. This means that, on average, those who participate in the training program are 8.6% more effective in their primary responsibility of taking customer calls (De Grip & Sauermann, 2012). The number 18 is the integer that follows 17 and precedes 19 in Column (2)



demonstrating that there is no significant association between an agent's reciprocal attitudes and the outcome variable, $\log(y_{it})$. This finding aligns with the pairwise correlation presented in Table 2, indicating that reciprocal agents do not exhibit inherently higher productivity. The number 19.

The primary focus of this study is the coefficient τ_3 , which serves as an indicator of whether the treatment impact varies among workers based on their level of reciprocity. The results presented in columns (3) and (4) of Table 3 indicate that there is a positive and statistically significant interaction effect between reciprocity and the randomized treatment. Specifically, a one standard deviation increase in worker reciprocity is associated with a 5-percentage-point difference in the estimated returns to training. The findings indicate that individuals who exhibit reciprocal behavior tend to demonstrate a greater treatment effect. This shows that these individuals are more likely to respond to training by exerting a higher level of effort, potentially motivated by a desire to reciprocate the investment made in their training and provide beneficial outcomes for their employer.

One potential issue to consider is the possibility that the measurement of reciprocity may be associated with unobservable, individual-specific attributes that are also linked to the individual benefits derived from training. If the motivation of unobserved workers, such as their level of reciprocity and the benefits they receive from training, is correlated, then the estimated effect of τ_3 may be influenced by motivation. This could lead to an overestimation of the interaction effect between reciprocity and the treatment dummy. One potential approach for addressing additional



characteristics is to incorporate an unobserved individual-specific characteristic μ_i into the error term in Equation (1) and estimate it using a fixed-effects framework. For the sake of simplicity, we will omit the subscript t and any additional covariates.

Table 3
Returns to Training and Interaction with Reciprocity

	(1)	(2)	(3)	(4)	(5)	(6)
Treatment Dummy	0.0861*** (0.0229)	0.1052*** (0.0164)	0.1090*** (0.0158)	0.0753*** (0.0235)	0.0877*** (0.0150)	0.1138*** (0.0208)
Peak-Hours	-0.2501** (0.0949)	-0.2666*** (0.0602)	-0.2732*** (0.0540)	-0.2642*** (0.0571)	-0.3697*** (0.0381)	-0.3559*** (0.0814)
Calls per FTE	0.0001 (0.0000)	0.0001* (0.0001)	0.0001* (0.0001)		0.0001** (0.0000)	0.0001 (0.0001)
Time Trend	0.0021 (0.0013)	0.0016** (0.0007)	0.0015* (0.0007)		0.0022*** (0.0006)	0.0014 (0.0008)
Reciprocity (std.)		0.0123 (0.0247)	0.0016 (0.0262)	0.0026 (0.0260)		0.0274 (0.0395)
Treatment × Reciprocity			0.0514** (0.0222)	0.0500** (0.0219)	0.0151** (0.0059)	0.0430* (0.0206)
Constant	-1.0473*** (0.0938)	-0.9735*** (0.0729)	-0.9629*** (0.0689)	-0.7978*** (0.0349)	-1.0162*** (0.0541)	-0.8637*** (0.0791)
Observations	1672	1672	1672	1672	1672	1531
Number of agents	63	63	63	63	63	57
Adjusted R ²	0.0706	0.2713	0.2790	0.3082	0.6109	0.3017
Worker FE	No	No	No	No	Yes	No
Week FE	No	No	No	Yes	No	No
Other measures of personality	No	No	No	No	No	Yes

Notes: The dependent variable in this study is the natural logarithm of the variable y_{it} . All regression models use fixed effects for the specific week during which agents participated in the survey. Additional indicators of personality encompass the Big Five traits, cognitive assessment outcomes,



negative reciprocity tendencies, locus of control orientation, and loyalty disposition. The standard errors are clustered at the level of teams.

Abbreviations: FE, fixed effect; FTE, full-time employee.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

$$\begin{aligned} \log(y_{it}) - \log(\bar{y}_i) &= \tau_1(d_{it} - \bar{d}_i) + \tau_2(rec_{it} - \bar{rec}_i) + \tau_3(d_{it} \cdot rec_{it} - \bar{d}_i \cdot \bar{rec}_i) \\ &\quad + \gamma(\mu_i - \bar{\mu}_i) + (\epsilon_i - \bar{\epsilon}_i) \\ &= \tau_1(d_{it} - \bar{d}_i) + \tau_3(d_{it} \cdot rec_{it} - \bar{d}_i \cdot \bar{rec}_i) + \epsilon'_i \end{aligned}$$

The variable τ^1 represents the estimated primary treatment impact. While the experimental design does not necessitate the inclusion of individual fixed effects to assess the causal impact of training (τ_2), the incorporation of fixed effects serves the aim of mitigating the influence of unobserved (fixed) attributes that may be associated with the measure of reciprocity.

The estimates for the whole sample, which include worker fixed effects, are presented in Column (5) of Table 3. In the present regression analysis, the calculated treatment impact of engaging in the training program is observed to be 2.1 percentage points lower when compared to the baseline effect as indicated in Column (3) of Table 3, which initially stood at 10.9%. The observed interaction effect between treatment and reciprocity is found to be smaller than one-third of the magnitude reported in Table 3 (1.5% compared to 5.1%, as indicated in Column 5 of Table 3). The estimated coefficients of the interaction effect in the two specifications exhibit a statistically significant difference, as indicated by a p-value of



10%. While it is challenging to definitively determine whether this phenomenon is caused by unobserved variables that are correlated with both reciprocity and the benefits of training, or if fixed effects enhance the accuracy of the estimated variable, the findings demonstrate the significance of accounting for individual fixed effects.

Do other Personality Traits and Test Scores Matter?

In order to gain further insights into the potential correlation between reciprocity and individual-specific features, supplementary survey questions were collected inside the same survey alongside the reciprocity measurement. The variables encompassed in this study comprise the Big Five personality traits, locus of control, a metric assessing negative reciprocity as a reflection of personality, cognitive test scores, and a measure of loyalty. The number provided by the user is 21. Numerous studies have demonstrated the significance of individual-specific features as influential factors in economic behavior across various contexts. The relevance of locus of control has been demonstrated in the context of on-the-job training, with respect to both participation in training and the subsequent returns (Caliendo et al., 2021; Offerhaus, 2013). The number 22. According to the findings presented in Table 2, there is a strong correlation between the Big Five personality traits and the measure of reciprocity, which is consistent with the results reported by Dohmen et al. (2008). On the other hand, there is no significant correlation observed between the cognitive test score, locus of control, negative reciprocity, and the measure of loyalty and the measure of reciprocity.

In order to examine the potential influence of these attributes on the



coefficient of primary interest, specifically the interaction effect between reciprocity and treatment (τ_{3}), Equation (1) is computed by incorporating each of these metrics. Column 6 of Table 3 demonstrates that the observed effect has a significantly diminished magnitude compared to the estimate obtained without accounting for these factors (Column 3). This implies that the inclusion of individual-specific fixed effects eliminates the possibility of any of these variables causing the lower estimate. In order to offer additional substantiation that the observed interaction effect between the treatment variable and the reciprocity measure is not solely influenced by other individual-specific attributes, supplementary information is provided. Table 3 expands upon the regression analysis shown in Column (3) of Table 3 by incorporating the inclusion of individual-specific features and their corresponding interaction effects with the treatment dummy variable. The coefficient of interest, which represents the interaction between reciprocity and the treatment, exhibits consistent significance and stability throughout all regression analyses, ranging from 0.042 to 0.056. The interaction effect becomes statistically negligible with a coefficient of 0.042 only when incorporating the Big Five personality trait of Neuroticism.

Reciprocating during or after training?

Having established that reciprocal individuals have higher returns to training, it is not clear why this is the case. There are two possible mechanisms that could drive this effect. First, reciprocal individuals could simply exert greater effort after participation in training, resulting in treatment effect heterogeneity by an individual's degree of reciprocity.



Second, reciprocity could already matter earlier; that is, reciprocal individuals are better in utilizing the training when participating in the training. Although it is difficult to find explicit tests to discriminate between these two mechanisms, higher effort during the training course should lead to more efficient human capital acquisition, as the skills of reciprocal agents are higher than those of nonreciprocal agents. This should lead to a more permanent increase in skills and create rather stable effects on worker performance. Human capital acquisition is not affected by reciprocity; however, one might rather expect a transitory effect on performance that might fade out.

Figure 2 shows the treatment effect and the interaction with reciprocity, separately, for each week before and after the training. The estimates, which are taken from an estimation with the same specification as shown in Column (5) of Table 3, show that both the treatment effect and its interaction with reciprocity are zero in the weeks before the training. The treatment effect exhibits a dynamic pattern, that is, it reaches a peak in the fifth week after training, and decreases substantially thereafter; this could be explained by spillover effects (De Grip & Sauermann, 2012), motivational effects, or even human capital depreciation. The solid gray line shows the interaction effect between the treatment dummy and reciprocity by week, after the training, and thereby corresponds to the interaction effect shown in Column (5) of Table 3. Although it is small in size, it does not follow the dynamics of the treatment effect. Towards the end of the observation period (week 11 after the training period), the point estimate of the interaction effect has almost the same magnitude as



the main effect, suggesting that reciprocal individuals have a small yet more permanent effect than nonreciprocal individuals. This could be, for example, explained by higher effort provision during training, resulting in more efficient human capital acquisition and more stable increases in performance.

Alternative Channels of Reciprocal Behavior

The results thus far provide evidence for treatment effect heterogeneity with respect to workers' degree of positive reciprocity. Although the descriptive analysis provides only limited evidence for significant correlation between reciprocity and other worker outcomes, reciprocal individuals might have alternative, possibly competing, channels through which training investments are returned. Examples for these competing channels are the number of hours worked by the agent and the number of hours of absence, for example, due to sickness.

First, reciprocal individuals could return the training investment by working longer hours. For the firm, this would result in better utilization of labor. Column (2) of Table 4 shows that when estimating Equation (1) with the number of working hours as an outcome variable, the interaction variable is not significant. When using the preferred specification including individual fixed effects to control for unobserved individual-specific characteristics that might be:

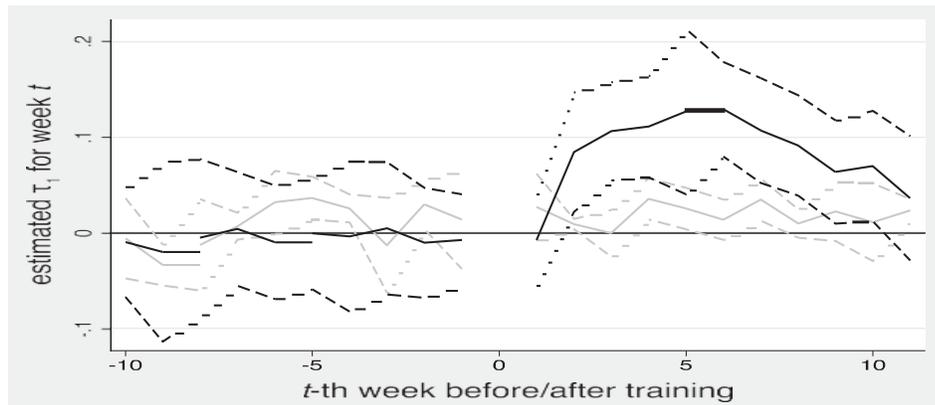


Figure 2

The study examines the impact of treatment and interaction effects on performance over a period of time. The provided diagram illustrates the estimated impact of the therapy on performance during each week before to and following the training. The solid black line represents the estimated treatment effect, while the dashed black lines represent the matching 95% confidence interval. The depicted gray lines illustrate the estimated interaction effect between the treatment dummy variable and the reciprocity measure. The solid gray line represents the estimated effect, while the dashed gray lines represent the associated 95% confidence intervals. The estimates in question are derived from a regression analysis that takes into account individual fixed effects, working hours, the proportion of peak hours, calls per full-time equivalent employee, a linear time trend, and the specific week during which the survey was conducted. This regression model is presented in Column 5 of Table 3. Week 0 is indicative of the initial training week. FTE, which stands for full-time employee.



Table 4
Returns to Training on Working Hours and Sickness Absence

Table with 7 columns: Outcome variable, (1) Working hours, (2), (3), (4) Hours of absence, (5), (6). Rows include Treatment dummy, Reciprocity (std.), Treatment reciprocity, Constant, Observations, Number of agents, Adjusted R^2, and Individual FE.

Notes: Dependent variable, number of working hours (Columns 1–3) and hours of absence (Columns 4–6). All regressions also include calls per FTE, a linear time trend, share of peak hours, and fixed effects for the week in which agents participated in the survey. Standard errors are clustered at the team level.

Abbreviations: FE, fixed effect; FTE, full-time employee.

*p < 0.10.

**p < 0.05.

***p < 0.01.

The measure of reciprocity is positively and significantly linked with the estimate. The findings of this study indicate that individuals who



exhibit a reciprocity level that is one standard deviation greater than their peers tend to increase their weekly working hours by 0.4 hours, as observed in Column 3 of the analysis.

Furthermore, it is possible that reciprocity could have a detrimental impact on the number of hours of absence. If those who reciprocate the training exhibit reduced levels of sickness absence, it can be inferred that the investment in training is reciprocated with a decrease in absence rates. Kampkötter and Marggraf (2015) as well as Adhvaryu et al. (2018) have demonstrated the influence of training participation on the aforementioned results. In order to examine this particular channel, Equation (1) is utilized to estimate the relationship, with the dependent variable being hours of absence. Regardless of whether individual fixed effects are included in the calculation, the findings indicate that the coefficient τ_3 exhibits the anticipated negative direction, but it is not statistically significant.

Do agents return the favor of being selected?

The findings presented in Section 3 are consistent with the hypothesis that reciprocal inclinations lead to greater returns on training. One potential strategic rationale is that individuals chosen to participate in the training program perceive themselves as members of an elite cohort, leading to heightened motivation. The number 26 is the numerical value that represents the quantity or count of something. The aforementioned motive, which exhibits a potential correlation with reciprocity, has the potential to elicit comparable responses. This could perhaps elucidate the reason behind the reduction in interaction effect between reciprocity and the treatment observed in the estimates of fixed effects. The agents chosen to participate in the field



trial were generally picked based on their length of service. The data presented in Table of the Supporting Information reveals that the tenure of agents participating in the field experiment surpasses the average tenure of all workers. The act of being chosen to participate in the field experiment could potentially be perceived by individuals as an indication that their employment within the organization, namely their unique skills and knowledge relevant to the firm, is highly regarded. In order to examine the presence of consistent differences in the effects of training based on the length of time an agent has been employed, the analysis in Column (5) of Table 3 is enhanced by include the variables of agent tenure and its interaction with the treatment indicator. Despite the implementation of an experimental design that guarantees equal distribution of tenure across the treatment and control groups, the presence of variability in tenure allows for its utilization in the analysis of this inquiry. The idea suggests that agents with more tenure will have more pronounced effects.

The estimates, however, indicate that the interaction effect between tenure and the treatment dummy variable is positive, although it does not reach statistical significance. While it cannot be definitively concluded that the inclusion in the training program had an impact on motivation and resulted in improved performance, this factor does not contribute to the interaction effect between the treatment and reciprocity.

Negative Effects on Nontrained Workers

Considering the fact that the training was structured as a training program spanning a duration of one week, a significant inquiry arises regarding the impact of temporarily removing a maximum of ten



workers from the work floor throughout the course of this week on the remaining agents. The numerical value provided is 27. This suggests that the department experiences a decrease in headcount of up to 10% during training weeks, while the team level has a more significant decrease of up to 66%.

In order to examine the impact of removing agents from teams for training reasons on the remaining workers, the study conducted a test. Specifically, Supporting Information Table was utilized to assess if the proportion of coworkers engaged in training had any effect on the immediate performance of the agents who were not selected for training. The presented data illustrates that an increase in the proportion of colleagues engaging in training courses has a slight detrimental impact on agent performance during the week in which their peers receive training. However, the estimation of this effect is uncertain.

CONCLUSION

While it has been observed through empirical research conducted by Leuven et al. (2005) that workers who possess favorable reciprocal tendencies tend to engage more frequently in training programs sponsored by their respective firms, there is currently a lack of evidence about the reciprocation of corporate training investments by individuals and the mechanisms by which this reciprocation occurs. This study presents previously unrecorded information on the relationship between reciprocal persons and their returns to firm-sponsored training, utilizing data obtained from a field experiment conducted in a call center located in the



Netherlands. In order to examine this hypothesis, the study combines personnel data containing panel information on worker performance with random assignment to training courses and direct assessments of reciprocal attitudes. In contrast to survey data sets, this particular scenario enables the identification of causal consequences of participating in the training program, as well as the examination of its interaction with survey measures of reciprocity.

After accounting for time-invariant individual-specific characteristics, the findings indicate that individuals who exhibit reciprocity tend to have greater returns from training. Specifically, employees who possess a degree of reciprocity that is one standard deviation higher than average observe a 1.5 percentage point increase in their returns to training. The findings indicate that individuals engaged in reciprocal labor arrangements exhibit greater levels of effort during the training program, leading to a more effective accumulation of human capital. Despite the seemingly minor impact, it is worth noting that the control group participants possessed prior knowledge of receiving instruction at a later point, which implies that the observed effects may be more substantial in different contexts. The discovery that individuals who possess reciprocal inclinations have greater returns on training has significant implications for the interaction between workers and firms.

This discovery presents an alternate mechanism via which the reciprocal exchange of gifts between employees and organizations can function. Furthermore, it proposes an alternate perspective on the rationale behind organizations' investment in human capital, notwithstanding the



potential threat of talent acquisition by competitors. The attitudes of workers towards each other have a reciprocal effect, which in turn enhances the motivation for enterprises to make investments in training programs and to selectively choose people during the hiring process (Englmaier et al., 2016). Furthermore, it is imperative to take into account alternative personality measures and individual fixed effects in order to address worker-specific variability that could potentially influence the estimated effect of interest. This is demonstrated by the significant reduction in the estimated effect when individual fixed effects are considered.

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