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**Social Trust Formation in the Workplace:
Applying the Job Strain Model to
Explain Variations in Social Trust Levels
among Employed Individuals**

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Abstract

This study applies the job strain model (JDC-S) to social trust to analyze how workplace characteristics influence social trust formation patterns. By defining the “workplace” as consisting of (1) workload, (2) control, and (3) social support, the JDC-S model predicts job demands to inversely relate to social trust, whereas job control and social support to positively affect trust among the employed. We utilize the sample of 60250 respondents from the Programme for the International Assessment of Adult Competencies (PIAAC) public-use data to operationalize the three components and to link them to social trust scores. Our analysis provides strong empirical evidence that the three factors are not only associated with trust among employed individuals but that their impact is also contingent on the respondents’ sex and age.

Keywords: social trust; job strain model; job characteristics; workplace properties; multilevel analysis

JEL Classification: D87, D91, J81

Social Trust Formation in the Workplace: Applying the Job Strain Model to Explain Variations in Social Trust Levels among Employed Individuals

Defined as the propensity of people in a society to cooperate (Coleman 1982 and 1990; Hardin 2006; Putnam 2000), social trust is recognized to be a function of numerous factors. An individual's employment status is often included among trust determinants (Hall 1999; Van Oorschot and Arts 2005). Employment relates to more optimism, certainty, or resources, yielding more trust. Unemployment nurtures distrust by placing individuals at a disadvantage relative to others (Hall 1999) or by creating the feeling that social groups, and society as a whole, have deprived the unemployed of opportunities for self-development (Christoforou 2004).

While the positive impact of employment on trust is well documented by theoretical and empirical studies, the relationship between employment properties and trust levels has received only limited attention. Initial research has focused on juxtaposing social trust in large versus small organizations, with a firm's size viewed as a function of a society's trust. Large firms are expected to emerge when strangers cooperate, whereas cooperation can only arise when trust already exists among individuals (Fukuyama 1995; La Porta et al. 1997). Further research has expanded the scope of analysis from a firm's size to various aspects of a firm's performance demonstrating that intra-firm trust improves financial performance (Goergen et al. 2012), labor productivity, and product or service quality (Brown et al. 2014).

By recognizing that the causal mechanism in the employment-trust nexus can go in both directions, recent studies commence to view trust levels as a function of a firm's practices and policies. Workplace trust proves to be influenced by a firm's performance appraisal system

(Mayer and Davis 1999), or HR practices, such as having formalized policies and procedures (Blunsdon and Reed 2003). Companies may destroy trust when resorting to restricting paid overtime as a means of dealing with recession (Brown et al. 2014). The amount of training provided by a firm to employees promotes the emergence of trust in management, whereas a respondent's union membership, workplace tenure or perceived workload may lead to a substantial decline in trust levels among the employed (Brown et al. 2014; Helliwell, Huang, and Putnam 2009).

This study contributes to the literature on the employment-trust nexus, by overcoming two key limitations in the current research. First, the analysis is often based on a narrow concept of trust, such as employee trust in management. This constitutes a considerable shortcoming given the recent findings that the workplace reflects the attributes of an individual's environment and can provide exposure to general social norms influencing trust towards other individuals, as well. For instance, Grund and Harbring (2009) suggest that the level of control at one's workplace changes generalized trust. More control leads one to trust others less, since it prompts individuals not to rely solely on trust but to resort to institutional mechanisms instead. Considering that an employed person spends about one third of the day (seen as 24 hours) at work, current research thereby overlooks an important field where social trust is formed and ignores numerous factors that can influence trust levels in society.

Second, research on the employment-trust relationship overlooks the wide range of workplace properties in analyzing how one's employment can impact social trust formation. This is a major disadvantage given the recent findings that jobs differ in many respects (Van Wanrooy et al. 2013), starting with the type of employment contract to a multitude of work tasks that individuals face in the workplace. To the authors' best knowledge, how numerous employment

characteristics relate to social trust has never been analyzed *in their integrity*. This can be explained by the fact that there is no conceptual framework in the trust literature that clearly defines which workplace properties might influence trust emergence. We argue that the job strain model, widely used to analyze the impact of job characteristics on an individual's mental and physical health, can be applied to explore how workplace properties affect *social trust* levels. By outlining the unobservable concept of the workplace, this model offers an analytical framework for identifying mechanisms that can explain social trust formation in the job.

BACKGROUND

The job strain model, often referred to as the JDC-S model, is used to study the impact of job characteristics on different aspects of an individual's mental and physical health. In particular, it has been applied to predict the incidence and prevalence of all-cause mortality (Kivimäki et al. 2006; Shirom et al. 2009; Shirom et al. 2011; Steenland et al. 2000), describe determinants of an individual's psychological well-being (De Lange et al. 2003; Häusser et al. 2010), and explain variations in an employee's physical health (Uchino 2004). According to the JDC-S model, the workplace can be divided into three components: (1) job demands, (2) control, and (3) social support (Karasek and Theorell 1990). The *job demands* category refers to psychological job demands, primarily defined as one's perceived workload and further narrowed to quantitative measures of one's overload in the job. Work overload creates stress, anger, aggressive behavior or conflicts, which is expected to negatively influence an individual's mental and physical health through increased activation of the hypothalamic-pituitary-adrenocortical system, sleep difficulties (Melamed et al. 2006), inflammatory or immune system responses (Shirom et al. 2008). *Job control* refers to a worker's perceived freedom in how to meet their job demands and

aims at reducing uncertainty in the workplace through providing exact instructions on how job tasks must be done. *Social support* refers to “overall levels of helpful social interaction available on the job from both coworkers and supervisors” (Karasek and Theorell 1990). Socialization at the workplace is anticipated to lead to a more positive work experience and stimulate a healthy work culture, since people enjoy working with someone who is familiar. The literature distinguishes between peer social support and supervisor social support. By reflecting how well a participant is socially integrated into their employment context, peer social support proves to better predict health outcomes than supervisor social support (Mookadam and Arthur 2004; Shirom et al. 2011).

The job strain model assumes job demands will negatively relate to the individual’s psychological and physical health variables, whereas job control and social support will positively affect them. The JDC-S model further assumes the effects of job demands on psychological and physiological strains to be moderated by job control and by work-based social support (De Lange et al. 2003; Van Der Doef and Maes 1998 and 1999). Research also points out that the interaction hypothesis receives support only when focusing on those dimensions of control and social support which are qualitatively relevant to the job demands under study (De Jonge and Dormann 2006; Karasek and Theorell 1990).

Finally, multiple studies have demonstrated that the impact of the JDC-S model’s key factors vary across sex and age. Due to contextual differences in the type of jobs occupied by men and women (Waldenstrom and Harenstam 2008), research has often revealed substantial variations in the extent to which workload, control, and social support predicts health outcomes of male and female employees. Usually, an analysis does not establish support for the postulated relationships when based on female samples, while providing strong empirical evidence when

based on male or mixed-sex samples (Van der Doef and Maes 1999). For instance, Nieuwenhuijsen, Bruinvels, and Frings-Dresen (2010) suggest that low levels of control are a risk factor for stress related disorders among men but not among women, whereas Shirom et al. (2011) point out that control reduces the risk of mortality for men and increases it for women.

Also, the JDC-S factor effects are expected to vary across age. The model better predicts health outcomes for individuals in the 38-45 age brackets than in the older or younger brackets (Shirom et al. 2011). The JDC-S components appear to have an accumulating impact, with the healthy worker effect becoming noticeable as one ages (Uchino 2004). Kivimäki et al. (2008) argue, however, that including employees over 45 in a sample may delude the associations among the model's key components and various health measures.

By replacing the measures of an individual's physical and mental health with trust scores, we utilize the job strain model's framework to analyze social trust. This strategy is in line with the current understanding of trust formation since social trust is often considered as a psychological state (Barber 1983; Jones 1996; Lewis and Weigert 1985) that is governed by both cognitive and affective processes (Ryff, Singer, and Dienberg Love 2004), while being embedded within complex neural and hormonal systems (Borum 2010). At the same time, multiple studies have evidenced a strong relationship between social trust and general health or disease-specific outcomes (e.g., cardiovascular disease, cancer) (Almedom and Glandon 2008; Gundelach and Kreiner 2004; Kim, Subramanian, and Kawachi 2008; Lynch et al. 2001)¹, often viewing social trust as shaped by an individual's mental health or physical condition. Sturgis, Patulny, and Allum (2009) suggest that individuals with physical or mental disabilities, especially those causing stigmatization or discrimination, often have lower trust levels. Borum (2010) points out that people with mental disorders are characterized by deficits in social

behavior in general and social trust in particular. Laurence (2015) demonstrates that increased mental distress leads to a decline in social trust levels, whereas developing a health problem (mental or physical) is often interpreted as a negative experience that reduces an individual's trust (Kim et al. 2008; Uslaner 2002). Applying the job strain model to social trust analysis does not hence contradict the existing definition of trust, but can allow including job-related factors in explaining the variation of trust levels among employed individuals.

Based on the logic of the JDC-S model, we postulate the following hypotheses:

Hypothesis 1: Job demands are expected to negatively affect social trust whereas job control and social support will positively affect trust levels.

Hypothesis 2: The negative effects of job demands on social trust are expected to be moderated by job control and social support.

Hypothesis 3: The effects of job demands, control, and social support on social trust are expected to vary across sex and age.

DATA AND METHODS

To test our hypotheses empirically, we utilize the public-use data from the Programme for the International Assessment of Adult Competencies (PIAAC) conducted by the OECD in 2012. The survey evaluates adults' proficiency in key information-processing skills and gathers information on how respondents use their skills at home, at work and in the wider community (see <https://www.oecd.org/site/piaac/surveyofadultskills.htm> for a more detailed description of the PIAAC survey). This database is unique, because it provides numerous employment-related variables while also containing a measure of social trust. The PIAAC public-use dataset has been downloaded from <http://vs-web-fs-1.oecd.org/piaac/puf-data>.

Our sample includes Belgium (Flanders), the Czech Republic, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Japan, Korea, the Netherlands, Norway, Poland, the Russian Federation, the Slovak Republic, Spain, Sweden, the United Kingdom (England and Northern Ireland), and the USA. The analysis excludes Australia, Austria, and Canada, since data for many employment-related variables are unavailable for these countries. The sample is restricted to respondents aged between 16 and 65 years. We only select those respondents who were employed or had a paid job at the time the survey was conducted. The following set of variables is used to empirically test our hypotheses (see Table 1 for descriptive statistics).

[Table 1 about here]

Dependent Variable

The PIAAC contains two questions that approximate the respondents' social trust. The first measures an individual's trustworthiness levels by asking about the extent to which respondents agree with the statement that "there are only few people they can trust completely". The second captures one's caution levels by asking about the degree to which respondents agree with the statement that "if you are not too careful, people will take advantage of you". We use the two measures in our analysis separately, since caution and trustworthiness are recognized to be independent facets of trust (Ben-Ner and Halldorsson 2010; Borum 2010; Miller and Mitamura 2003). Both questions have an initial response scale varying from 1 "strongly agree" to 5 "strongly disagree". We make the two variables dichotomous by assigning the value of one when the initial responses are "4" or "5" and the value of zero when otherwise.

Independent Variables

The job demands factor measures an individual's quantitative overload operationalised through three variables: work hours, task complexity, and job sector. Work hours represent a direct measure of workload and refer to the number of weekly work hours. Task complexity captures the variety and complexity of job tasks that the individual has as part of their workplace responsibilities and is operationalized through the frequency with which the respondent does 18 work-related tasks relevant to reading, writing, or using mathematics. Each item has responses varying from 1 "never" to 5 "every day". Since all of the tasks require cognitive action, we combine the responses into one variable. The final construct has values ranging from 18 "doing none of the tasks listed" to 90 "doing all of the tasks listed every day". The job sector variable indirectly approximates one's workload and is derived from recent findings that private sector jobs involve more stress, more tasks and higher competition at the workplace as compared to public or non-profit sector jobs (Blaug, Kenyon, and Lekhi 2007; Demmke 2005; Munnell and Fraenkel 2013). It is operationalized through two dummies specifying whether the individual's job belongs to the private or non-profit sector, with the public sector representing a reference category.

Control includes four items assessing the extent to which the respondent is able to choose or change (1) the sequence of tasks, (2) how one does their work, (3) the speed or rate at which one works, and (4) working hours. The response scale for each question varies from 1 "not at all" to 5 "to a very high extent."

Social support is operationalized through three items approximating the individual's contacts with co-workers or supervisors for work-related reasons such as learning, cooperating or sharing work-related information. The first item describes the frequency with which the individual interacts with co-workers or supervisors for learning new work-related things, with

the response scale ranging between 1 “never” and 5 “every day.” The second item specifies the share of time that the respondent usually spends on cooperating or collaborating with co-workers, with the response values varying from 1 “none of the time” to 5 “all the time.” The third item represents the frequency with which the respondent interacts in the workplace for sharing work-related information, with responses ranging between 1 “never” and 5 “every day.” We admit that the selected measures only remotely capture the quality of social environments in the job by exclusively focusing on interactions for work-related reasons. The choice of operationalizations is driven by the PIAAC’s limited availability of variables relevant to socialization in the workplace.

The set of selected operationalizations for the independent variables are rescaled to change between zero and one.

Control Variables

We control for the conventional determinants of trust: one’s participation in volunteering, political efficacy, health condition, immigration status, and age. Participation in voluntary activities is measured by asking how often the respondent did voluntary work in the last twelve months, with responses varying from 1 “never” to 5 “every day”. Political efficacy is operationalised by asking respondents to specify whether they agree with the following statement “People like me do not have any say about what the government does”. The response scale ranges between 1 “strongly agree” to 5 “strongly disagree”. Health condition is measured by asking respondents to self-rate their health status on a scale from 1 “poor” to 5 “excellent”. Immigration status is captured by a dummy variable that takes the value of 1 if the respondent was born in the country where the survey was conducted. Age is measured in ten year bands.

In addition, we control for workplace characteristics such as company size, managerial responsibilities, the level of challenge at work and one's participation in learning. The company size variable refers to the number of people working for the respondent's current employer. The responses vary from 1 "1 to 10 people" to 5 "more than 1000 people." One's involvement in managerial responsibilities is captured by a dummy variable that takes the value of 1 if the respondent currently manages or supervises other employees. The level of challenge at the workplace is measured through a dummy that takes the value of 1 if the individual specifies that they can cope with more demanding duties than those that are currently required at their job. Participation in lifelong learning is measured by a set of questions where respondents choose whether they did any of the following learning activities within the last twelve months: (1) courses or private lessons, (2) seminars or workshops, (3) courses conducted through open or distance education, (4) any organised sessions for on-the-job training or training by supervisors or co-workers. Since each item has two values with 1 "yes" or 0 "no", we sum up responses to the above questions so that the final construct has values ranging from 0 "no participation in lifelong learning" to 4 "active participation in lifelong learning".

Methods Used in the Analysis

We primarily use a multilevel analysis to account for the hierarchical structure of our data (Kreft and De Leeuw 1998) and to prevent the un-modelled country information from all being pooled into the single individual error term (Luke 2004). The main effect model takes the following form:

$$Trust_{ij} = \gamma_{00} + \gamma_{10}Job_demands_{ij} + \gamma_{20}Control_{ij} + \gamma_{30}Social_support_{ij} + \gamma_{40}X_{ij} + m_{0j} + \epsilon_{ij} \quad (1)$$

The interactions between the main factors are modelled as

$$Trust_{ij} = \gamma_{00} + \gamma_{10}Job_demands_{ij} + \gamma_{20}Control_{ij} + \gamma_{30}Social_support_{ij} + \gamma_{40}(Job_demands*Control)_{ij} + \gamma_{50}(Job_demands*Social_support)_{ij} + \gamma_{60}X_{ij} + m_{0j} + \varepsilon_{ij} \quad (2)$$

Here, *Trust* is the respondents' trust scores. *Job_demands*, *Control*, *Social_support* are the JDC-S model's key components operationalised as described above. *Job_demands*Control* and *Job_demands*Social_support* are the interaction terms between the job demands variables and the two other key model factors. *X* is the set of individual-level control variables; *m* is the country-level variance, whereas ε is the individual-level variance. The STATA *gllamm* command is utilised for calculating the model's parameters. Since social trust is a dichotomous variable, the *logit* link is specified together with the *binomial* family sub-option. Additionally, we include the *adapt* option, which causes adaptive quadrature to be used instead of ordinary quadrature.

EMPIRICAL RESULTS

The base model results (see Table 2) are consistent with the conventional understanding of trust formation processes (Christoforou 2004; Hall 1999; Van Oorschot and Arts 2005). Participation in voluntary activities promotes trust emergence. Trust is more likely to appear among individuals with a more positive perception of political efficacy in their country. Trust is higher among employees with managerial responsibilities and among individuals working in larger companies. Respondents with better health condition or individuals who were born in the country where the survey was conducted also report higher trust scores. Trust increases with age and

declines when respondents are not challenged by their job. Finally, participation in lifelong learning promotes trust formation among the employed.

[Table 2 about here]

We further augment the base trust regression with the JDC-S model's key predictors (see Table 3). As the theory suggests, the two measures of job demands (work hours and job sector type) relate negatively to social trust, with task complexity in contrast reinforcing trust among the employed. Opposite to the JDC-S model predictions, control levels represent a negative factor for social trust formation. Less flexibility regarding the choice of task sequence, how work is accomplished, and work hours prove to negatively relate to the two trust measures. The only exception here is control over the speed or rate at which one works, with more control of this kind yielding more trust.

As predicted by the job strain model, the social support variables positively impact social trust, especially with respect to trustworthiness. Employee interactions for the purpose of learning or sharing work-related information are positively associated with trust levels, suggesting that workplace socialization should be integrated in the experiential perspective on trust. Like any other form of socialization, interactions for work-related reasons can also contribute to nurturing reciprocity, cooperation, empathy for others, and an understanding of the common interest and common good and thereby change trust levels.

Our results can be also considered robust (Appendices A to C) to controlling for: (1) the self-selection problem, (2) limitations in our operationalization strategies, and (3) the inclusion

of additional control variables. The JDC-S model's constructs still remain strong predictors of social trust, without the direction of their impact to reverse.

[Table 3 about here]

Overall, we only received partial support for Hypothesis 1. The greatest deviation from the model's predictions have been found with regard to the impact that control levels conduct on social trust. This finding can be explained by the fact that in the case of social trust, individuals appraise tangible results not by their objective worth but by the manner in which they are attained (De Charms 1968). Previous studies on trust have also demonstrated a negative relationship between control levels in the workplace and social trust scores. Increased control at work may prompt individuals to trust less as they learn that others expect them not to be trustworthy, which might be interpreted as a general social norm (Grund and Harbring 2009) and extrapolated to trusting others in environments unrelated to a job.

Including interactions into the trust equations does not provide evidence for the JDC-S model's expectations regarding smoothing effects that control and social support conduct on job demands' negative influence on social trust (see Table 4). We establish only few statistically significant interactions and hence no support for Hypothesis 2. Note that one should focus on the specific dimensions of control and social support that are qualitatively relevant to the job demands under study in order to support the interaction analysis (De Jonge and Dormann 2006). This was not possible in the current study due to the PIAAC's limited operationalization choices available for the three JDC-S key factors.

[Table 4 about here]

We now turn to the question of how an individual's sex and age modify the relationship between the JDC-S model's three constructs and social trust. In line with Hypothesis 3, our results suggest that men and women differ in how job demands, control, and social support influence the key dependent variables (see Table 5). Men are more negatively affected by the workload, as measured through the number of work hours, whereas women's social trust is more sensitive to their job sector. Control is more of an issue for women than for men, which is commensurate with other studies (Shirom et al. 2011; Waldenstrom and Harenstam 2008). Social support is more important for women than for men, especially with respect to trustworthiness. In the case of caution, the positive impact of learning from others was established among men, whereas women need more contacts that involve sharing work-related information in order to develop trust. Shirom et al. (2011) and Waldenstrom and Harenstam (2008) suggest that differences in the type of jobs occupied by men and women can explain variations in the JDC-S key factors' impact on the dependent variables, based on an individual's sex.

[Table 5 about here]

Our research is in line with the existing findings concerning the modifying effects of age (see Table 6 and Table 7). Workload is a negative factor for all age groups, with its impact diminishing as an individual becomes older. This trend is stronger for the work hours variable and for caution as a measure of social trust. Task complexity and job sector dummies have a rather cumulative effect, with their impact being stronger for older cohorts. We reveal a similar

cumulative effect when analyzing variations in how the selected control items impact the trust measures. The strength of their influence is greater for older individuals and with the caution measure of trust. In line with Shirom et al. (2011), the positive impact of social support (through learning from others) on trust scores is greater for those in the 35-44 age bracket than in the older or younger cohorts. Similarly, social support through sharing information with others increases in its strength with age with both measures of social trust. These results support Uchino's study (2004), demonstrating that job strain model factors may predict outcomes more powerfully as one becomes older, assuming the stability of workplace properties across time.

[Table 6 and Table 7 about here]

Overall, our results reflect the existence of strong associations between workplace properties and social trust. Of course, these associations are probabilistic and not deterministic in nature, and having low workload and control or wide social networks in the job does not automatically mean that one would have high levels of social trust. It means, however, that that individual is more likely to have social trust above average than average trust. Workplace can powerfully affect an individual's trust by providing multiple experiences that change one's core sense of self that is used to evaluate others in everyday life. By subtly shifting one's self-concept, job environments may shape how that person judges others not only in job-relevant contexts but also in contexts outside of workplace (Goffman 1959).

DISCUSSION

This study argues that the analysis of social trust formation should go beyond the traditional sources relevant to family, networks, society, and government. Workplaces should be incorporated into the research on trust determinants. By applying the JDC-S model, we link the workplace to social trust and demonstrate that trust is a function of the workload, control levels at work, and social support. We also look into interactions between the three workplace factors but do not establish any substantial modifying effects that control or social support may have on job demands' negative impact on trust levels. Finally, we test the extent to which the JDC-S model's main effects are contingent on sex and age. Social trust among men proves to be more sensitive to workload and social support through learning, whereas trust levels among women relate more powerfully to control items and social support through sharing work-related information. With respect to age, cumulative effects appear not only in the case of social support, as previous studies on the JDS-C model suggest (Shirom et al. 2011; Uchino 2004), but also in the case of control and job demand items.

Further research is needed, however, to further validate our findings. First, longitudinal data can be used to control for any potential endogeneity of some of the right-hand side variables. Individuals may choose jobs and work environments that suit their trust levels. Similarly, employers may seek out and recruit people for certain job slots according to their perceptions of those workers' attributes, including their propensity to trust. Second, better operationalizations should be found for job demands and social support items. The workload measure used in our analysis does not capture the multiple types of stress that characterize a participant's job, whereas social support limited to the frequency of workplace contacts does not address the qualitative side of job-related contacts.

NOTES

1. The causal mechanism in the relationship between social trust and health outcomes can go in both directions (Kawachi et al. 1997; Kawachi and Berkman 2000; Kim and Kawachi 2006).

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Table 1. Descriptive Statistics for the Key Variables Used in the Analysis.

VARIABLES	Obs.	Mean	Std. dev.	Min.	Max.
Social trust: trustworthiness	60250	0.228	0.419	0	1
Social trust: caution	60250	0.206	0.404	0	1
<i>Job demands</i>					
Working hours	60250	0.379	0.117	0	1
Task complexity	60250	0.397	0.215	0	1
Job sector Private	60250	0.681	0.465	0	1
Job sector Non-profit	60250	0.029	0.168	0	1
<i>Control (over)</i>					
Sequence of tasks	60250	0.668	0.252	0	1
How to do work	60250	0.679	0.245	0	1
Speed of working	60250	0.670	0.237	0	1
Working hours	60250	0.493	0.267	0	1
<i>Social support (through)</i>					
Learning from coworkers and supervisors	60250	0.643	0.257	0	1
Cooperating with others	60250	0.677	0.282	0	1
Sharing work-related information	60250	0.858	0.233	0	1
<i>Key control variables</i>					
Participation in volunteering	60250	1.620	1.005	1	5
Political efficacy	60250	2.786	1.252	1	5
Subjective health condition	60250	2.477	0.977	1	5
Born in the country	60250	0.912	0.283	0	1
Age	60250	3.086	1.251	1	5
Company size	60250	2.466	1.215	1	5
Managerial responsibilities	60250	0.294	0.456	0	1
Challenged by the job	60250	0.829	0.377	0	1
Life-long learning	60250	0.238	0.245	0	1
<i>Additional control variables</i>					
Intelligence level	60250	0.562	0.126	0	1
Satisfaction with job	60250	2.017	0.837	1	5
Income	57910	3.397	1.458	1	6

Note: The selected operationalizations for the key independent variables are rescaled to change between zero and one.

Table 2. Base Social Trust Model.

VARIABLES	Trustworthiness	Caution
Participation in volunteering	0.112*** (0.010)	0.067*** (0.011)
Political efficacy	0.389*** (0.009)	0.306*** (0.009)
Subjective health condition	0.195*** (0.012)	0.209*** (0.012)
Born in the country	0.184*** (0.039)	0.244*** (0.041)
Age	0.092*** (0.009)	0.119*** (0.009)
Company size	0.046*** (0.009)	0.039*** (0.009)
Managerial responsibilities	0.082*** (0.023)	0.086*** (0.024)
Challenged by the job	-0.059** (0.029)	-0.103*** (0.029)
Life-long learning	0.765*** (0.045)	0.732*** (0.047)
Constant	-2.978*** (0.141)	-2.913*** (0.131)
Log likelihood	-28022.561	-26221.358
Between-class variance	0.304 (0.093)	0.548 (0.124)
Number of level 1 units	60250	60250
Number of level 2 units	20	20

Note: Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ (two-tailed tests).

Table 3. The JDC-S Model Applied to Social Trust.

VARIABLES	Trustworthiness	Caution
<i>Job demands</i>		
Working hours	-0.443*** (0.102)	-0.646*** (0.106)
Task complexity	0.548*** (0.067)	0.293*** (0.071)
Job sector Private	-0.232*** (0.024)	-0.306*** (0.025)
Job sector Non-profit	0.043 (0.060)	0.087 (0.062)
<i>Control (over)</i>		
Sequence of tasks	0.174*** (0.063)	0.198*** (0.066)
How to do work	0.202*** (0.065)	0.209*** (0.068)
Speed of working	-0.191*** (0.060)	-0.167*** (0.063)
Working hours	0.249*** (0.047)	0.208*** (0.048)
<i>Social support (through)</i>		
Learning from coworkers and supervisors	0.184*** (0.048)	-0.013 (0.050)
Cooperating with others	-0.060 (0.045)	-0.038 (0.047)
Sharing work-related information	0.202*** (0.059)	0.088 (0.061)
Base model controls		
Constant	Yes -3.089*** (0.142)	Yes -2.639*** (0.189)
Log likelihood	-27831.601	-27698.418
Between-class variance	0.302 (0.061)	0.280 (0.066)
Number of level 1 units	60250	60250
Number of level 2 units	20	20

Note: Standard errors in parentheses. As controls, each trust regression contains the full list of variables from the social trust base model.

*** p<0.01, ** p<0.05, * p<0.1 (two-tailed tests).

Table 4. The Analysis of Modifying Effects of Control and Social Support on the Relationship between Job Demands and Social Trust.

VARIABLES	Trustworthiness	Caution
<i>Interactions between Job demands and Control</i>		
Working hours*Control over sequence of tasks	0.761 (0.579)	0.784 (0.478)
Working hours*Control over how to do work	0.028 (0.175)	0.269 (0.403)
Working hours*Control over speed of working	0.132 (0.382)	0.333 (0.532)
Working hours*Control over choosing working hours	0.047 (0.333)	0.332 (0.348)
Task complexity*Control over sequence of tasks	0.734*** (0.211)	0.234 (0.370)
Task complexity*Control over how to do work	0.537*** (0.130)	0.386 (0.272)
Task complexity*Control over speed of working	0.314 (0.219)	0.033 (0.334)
Task complexity*Control over choosing working hours	0.429** (0.199)	0.265 (0.269)
Job sector Private*Control over sequence of tasks	0.001 (0.097)	-0.092 (0.096)
Job sector Non-profit*Control over sequence of tasks	0.231 (0.264)	-0.036 (0.287)
Job sector Private*Control over how to do work	-0.045 (0.102)	-0.153 (0.152)
Job sector Non-profit*Control over how to do work	0.125 (0.283)	0.144 (0.289)
Job sector Private* Control over speed of working	0.146 (0.101)	0.059 (0.122)
Job sector Non-profit*Control over speed of working	0.149 (0.277)	0.146 (0.269)
Job sector Private*Control over choosing working hours	-0.114 (0.105)	-0.244*** (0.089)
Job sector Non-profit*Control over choosing working hours	0.106 (0.307)	0.008 (0.234)
<i>Interactions between Job demands and Social support</i>		
Working hours*Learning from coworkers and supervisors	-0.172 (0.338)	0.209 (0.388)
Working hours*Cooperating with others	-0.307 (0.319)	-0.567 (0.429)
Working hours*Sharing work-related information	0.127 (0.368)	-0.308 (0.490)
Task complexity*Learning from coworkers and supervisors	0.255 (0.206)	-0.078 (0.203)
Task complexity*Cooperating with others	0.195 (0.225)	0.067 (0.283)
Task complexity*Sharing work-related information	0.293	-0.242

	(0.230)	(0.228)
Job sector Private*Learning from coworkers and supervisors	-0.127	-0.256***
	(0.094)	(0.098)
Job sector Non-profit*Learning from coworkers and supervisors	0.159	-0.439*
	(0.247)	(0.250)
Job sector Private*Cooperating with others	0.085	-0.070
	(0.084)	(0.104)
Job sector Non-profit*Cooperating with others	0.078	-0.083
	(0.223)	(0.225)
Job sector Private*Sharing work-related information	0.086	-0.296**
	(0.114)	(0.118)
Job sector Non-profit*Sharing work-related information	0.798***	-0.247
	(0.306)	(0.282)
Number of level 1 units	60250	60250
Number of level 2 units	20	20

Note: Standard errors in parentheses. The interaction terms are included sequentially in the social trust augmented model.

*** p<0.01, ** p<0.05, * p<0.1 (two-tailed tests).

Table 5. The JDC-S Model Applied to Social Trust, by Gender.

VARIABLES	Trustworthiness		Caution	
	Male	Female	Male	Female
<i>Job demands</i>				
Working hours	-1.023*** (0.207)	-0.796*** (0.342)	-0.931*** (0.204)	-0.644 (0.400)
Task complexity	0.488*** (0.124)	0.146*** (0.123)	0.156 (0.199)	-0.010 (0.170)
Job sector Private	-0.172*** (0.039)	-0.326*** (0.069)	-0.187*** (0.038)	-0.339*** (0.090)
Job sector Non-profit	0.042 (0.127)	-0.211** (0.102)	-0.121 (0.146)	-0.192 (0.147)
<i>Control (over)</i>				
Sequence of tasks	0.334** (0.132)	0.414*** (0.144)	0.321* (0.182)	0.538*** (0.146)
How to do work	0.241* (0.132)	0.426*** (0.126)	0.571*** (0.174)	0.460*** (0.139)
Speed of working	-0.229** (0.092)	-0.365** (0.162)	-0.268* (0.163)	-0.351** (0.166)
Working hours	0.472*** (0.098)	0.445*** (0.135)	0.513*** (0.149)	0.578*** (0.155)
<i>Social support (through)</i>				
Learning from coworkers and supervisors	0.401*** (0.087)	0.361*** (0.107)	0.239** (0.117)	0.125 (0.123)
Cooperating with others	-0.117 (0.121)	0.021 (0.104)	-0.083 (0.117)	0.014 (0.149)
Sharing work-related information	0.144 (0.115)	0.374*** (0.121)	-0.052 (0.150)	0.278*** (0.105)
Constant	3.280*** (0.213)	3.197*** (0.225)	2.883*** (0.214)	3.002*** (0.288)
Number of level 1 units	30060	30190	30060	30190
Number of level 2 units	20	20	20	20

Note: Standard errors in parentheses. As controls, each trust regression contains the full list of variables from the social trust base model. Due to space limits, we do not report estimations for the between-class variance and log likelihood.

*** p<0.01, ** p<0.05, * p<0.1 (two-tailed tests).

Table 6. The JDC-S Model Applied to Social Trust by Age: The Case of Trustworthiness.

VARIABLES	Age groups				
	24 or less	25 – 34	35 – 44	45 – 54	55 plus
<i>Job demands</i>					
Working hours	-1.296*** (0.330)	-0.858*** (0.282)	-1.239*** (0.237)	-0.724** (0.288)	-1.119*** (0.192)
Task complexity	0.189 (0.204)	0.284* (0.166)	0.238 (0.204)	0.462*** (0.160)	0.045 (0.221)
Job sector Private	-0.244*** (0.078)	-0.309*** (0.054)	-0.267*** (0.065)	-0.188*** (0.064)	-0.301*** (0.106)
Job sector Non-profit	0.180 (0.196)	-0.188* (0.103)	-0.163 (0.162)	0.135 (0.139)	-0.184 (0.157)
<i>Control (over)</i>					
Sequence of tasks	0.107 (0.180)	0.179 (0.138)	0.363** (0.164)	0.578*** (0.185)	0.584*** (0.194)
How to do work	-0.101 (0.156)	0.261* (0.155)	0.592*** (0.181)	0.294** (0.145)	0.605*** (0.202)
Speed of working	0.167 (0.148)	0.007 (0.144)	-0.604*** (0.185)	-0.424*** (0.102)	-0.424* (0.229)
Working hours	0.055 (0.160)	0.374*** (0.122)	0.653*** (0.189)	0.556*** (0.107)	0.493*** (0.149)
<i>Social support (through)</i>					
Learning from coworkers and supervisors	0.318*** (0.110)	0.079 (0.131)	0.580*** (0.124)	0.375*** (0.095)	0.307** (0.153)
Cooperating with others	0.106 (0.167)	-0.062 (0.108)	-0.035 (0.145)	-0.037 (0.143)	-0.134 (0.231)
Sharing work-related information	0.162 (0.184)	0.169 (0.171)	0.215 (0.151)	0.359*** (0.131)	0.195 (0.168)
Constant	2.274*** (0.265)	2.502*** (0.301)	3.015*** (0.231)	2.962*** (0.283)	2.957*** (0.293)
Number of level 1 units	7051	14213	15091	14394	9501
Number of level 2 units	20	20	20	20	20

Note: Standard errors in parentheses. As controls, each trust regression contains the full list of variables from the social trust base model. Due to space limits, we do not report estimations for the between-class variance and log likelihood.

*** p<0.01, ** p<0.05, * p<0.1 (two-tailed tests).

Table 7. The JDC-S Model Applied to Social Trust by Age: The Case of Caution.

VARIABLES	Age groups				
	24 or less	25 – 34	35 – 44	45 – 54	55 plus
<i>Job demands</i>					
Working hours	-1.365*** (0.549)	-0.819*** (0.362)	-1.142*** (0.376)	-0.786** (0.320)	-0.532 (0.359)
Task complexity	-0.268 (0.174)	0.067 (0.210)	0.048 (0.252)	0.074 (0.183)	0.394** (0.168)
Job sector Private	-0.236*** (0.082)	-0.339*** (0.076)	-0.339*** (0.077)	-0.309*** (0.082)	-0.362*** (0.064)
Job sector Non-profit	-0.028 (0.269)	-0.166 (0.182)	-0.191 (0.210)	0.126 (0.196)	-0.115 (0.107)
<i>Control (over)</i>					
Sequence of tasks	0.443** (0.190)	0.433** (0.173)	0.309 (0.209)	0.543** (0.243)	0.644*** (0.182)
How to do work	-0.311 (0.192)	0.342** (0.172)	0.694*** (0.184)	0.478** (0.206)	0.525** (0.207)
Speed of working	-0.234 (0.236)	-0.152 (0.167)	-0.340 (0.229)	-0.443*** (0.155)	-0.635*** (0.171)
Working hours	0.313** (0.148)	0.292 (0.191)	0.681*** (0.202)	0.629*** (0.135)	0.353** (0.145)
<i>Social support (through)</i>					
Learning from coworkers and supervisors	0.179 (0.178)	0.062 (0.136)	0.249** (0.125)	0.133 (0.134)	0.455*** (0.130)
Cooperating with others	0.269 (0.167)	0.001 (0.116)	-0.043 (0.143)	-0.059 (0.122)	-0.143 (0.166)
Sharing work-related information	-0.229 (0.159)	0.034 (0.155)	0.169 (0.148)	0.323** (0.157)	0.409** (0.190)
Constant	1.882*** (0.293)	2.051*** (0.341)	2.514*** (0.346)	2.447*** (0.193)	2.121*** (0.339)
Number of level 1 units	7051	14213	15091	14394	9501
Number of level 2 units	20	20	20	20	20

Note: Standard errors in parentheses. As controls, each trust regression contains the full list of variables from the social trust base model. Due to space limits, we do not report estimations for the between-class variance and log likelihood.

*** p<0.01, ** p<0.05, * p<0.1 (two-tailed tests).

APPENDIX A. Controlling for Self-Selectivity in the Trust Equations.

VARIABLES	Self-selection into trustworthiness		Self-selection into caution	
	(1)	(2)	(1)	(2)
Identifying variables				
Intelligence level	1.194*** (0.049)	1.199*** (0.048)	2.229*** (0.051)	2.230*** (0.049)
<i>Areas of study</i>				
General programs	Ref. category	Ref. category	Ref. category	Ref. category
Teacher training and education science	0.188*** (0.027)	0.225*** (0.024)	0.265*** (0.029)	0.211*** (0.025)
Humanities, languages and arts	0.126*** (0.026)	0.171*** (0.024)	0.095*** (0.028)	0.120*** (0.024)
Social sciences, business and law	0.087*** (0.019)	0.146*** (0.018)	0.116*** (0.019)	0.115*** (0.018)
Science, mathematics and computing	0.057** (0.025)	0.077*** (0.023)	0.000 (0.026)	-0.034 (0.023)
Engineering, manufacturing and construction	0.066*** (0.017)	-0.010 (0.017)	0.000 (0.018)	-0.076*** (0.017)
Agriculture and veterinary	0.059 (0.037)	0.005 (0.036)	0.017 (0.038)	0.033 (0.036)
Health and welfare	0.204*** (0.023)	0.290*** (0.021)	0.283*** (0.025)	0.343*** (0.021)
Services	-0.039* (0.024)	-0.061** (0.024)	-0.042* (0.024)	-0.120*** (0.024)
<i>Work tasks</i>				
Frequency of teaching	0.015*** (0.005)	0.035*** (0.005)	0.018*** (0.005)	0.029*** (0.005)
Frequency of making presentations	0.052*** (0.006)	0.073*** (0.005)	0.064*** (0.006)	0.093*** (0.005)
Frequency of selling	-0.005 (0.004)	-0.006 (0.004)	-0.019*** (0.004)	-0.014*** (0.004)
Frequency of advising others	-0.012** (0.005)	-0.001 (0.004)	0.010** (0.005)	0.022*** (0.005)
Frequency of planning own activities	0.019*** (0.005)	0.024*** (0.005)	0.026*** (0.005)	0.006 (0.005)
Frequency of planning others' activities	-0.006 (0.004)	-0.014*** (0.004)	-0.014*** (0.005)	-0.029*** (0.004)
Frequency of organizing own time	-0.000 (0.005)	-0.004 (0.005)	-0.001 (0.005)	0.005 (0.005)
Frequency of influencing others' activities	0.013*** (0.005)	0.028*** (0.005)	-0.001 (0.005)	0.000 (0.005)
Frequency of negotiating with others	-0.018*** (0.005)	-0.025*** (0.004)	-0.006 (0.005)	-0.009** (0.004)
Frequency of simple problem solving	-0.014*** (0.005)	0.006 (0.005)	-0.015*** (0.005)	-0.014*** (0.005)
Frequency of complex problem solving	0.003 (0.005)	0.016*** (0.005)	-0.013** (0.006)	-0.003 (0.005)
The augmented trust equation				
<i>Job demands</i>				
Working hours	-0.347*** (0.040)	-0.075* (0.042)	-0.389*** (0.037)	-0.019 (0.040)
Task complexity	0.052* (0.027)	-0.157*** (0.029)	-0.042* (0.026)	-0.239*** (0.029)
Job sector Private	-0.108***	-0.047***	-0.104***	-0.069***

	(0.010)	(0.010)	(0.009)	(0.009)
Job sector Non-profit	-0.038	-0.048*	-0.043*	-0.062***
	(0.027)	(0.025)	(0.025)	(0.024)
<i>Control (over)</i>				
Sequence of tasks	0.203***	0.129***	0.085***	0.107***
	(0.019)	(0.021)	(0.018)	(0.019)
How to do work	0.014	0.004	0.016	0.063***
	(0.018)	(0.019)	(0.017)	(0.018)
Speed of working	0.051**	0.073***	0.027	-0.008
	(0.023)	(0.025)	(0.022)	(0.024)
Working hours	0.138***	0.059**	0.182***	0.034
	(0.026)	(0.027)	(0.024)	(0.026)
<i>Social support (through)</i>				
Learning from coworkers and supervisors	0.127***	0.071**	0.175***	0.100***
	(0.027)	(0.028)	(0.025)	(0.026)
Cooperating with others	0.131***	0.008	0.117***	0.003
	(0.025)	(0.026)	(0.023)	(0.024)
Sharing work-related information	0.216***	0.062***	0.221***	0.057***
	(0.019)	(0.019)	(0.018)	(0.019)
Rho	-0.263	-0.346	-0.309	-0.029
	(0.020)	(0.030)	(0.015)	(0.031)
Sigma	0.961	0.662	0.909	0.637
	(0.003)	(0.006)	(0.004)	(0.003)
Lambda	-0.253	-0.229	-0.281	-0.018
	(0.020)	(0.021)	(0.015)	(0.020)

Note: Standard errors in parentheses. Columns (1) and (2) report results for the Heckman two-step selection model. The base trust model's control variables are included in the trust equations. The identifying variables are operationalized as follows: Intelligence level is measured by averaging the cognitive test results in the areas of literacy and numeracy. Each of the two constructs is calculated as a mean of the ten possible values that the PIAAC survey provides. Areas of study dummies are derived from the question asking respondents to specify to which field their study belongs. Work tasks are operationalized through questions asking how often the individual deals with certain tasks, with responses varying from 1 "never" to 5 "every day". Column (1) reports results for the Heckman two-step selection model in which the dependent variable is rescaled to take the value of 0 when the initial trust measures take the value of zero and the value of 1 when otherwise. Column (2) reports results for the Heckman two-step selection model in which the dependent variable is rescaled to take the value of 0 when the initial trust measures take the value of zero or one and the value of 1 when otherwise.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ (two-tailed tests).

APPENDIX B. Controlling for Limitations in the Key Variables' Operationalization Approach.

VARIABLES	JDS-C model		JDS-C model with interactions			
	Trustworthiness	Caution	Trustworthiness		Caution	
<i>Main factors</i>						
Job demands	0.113*** (0.011)	0.149*** (0.011)	0.114*** (0.010)	0.113*** (0.011)	0.147*** (0.011)	0.147*** (0.011)
Control	0.129*** (0.014)	0.114*** (0.014)	0.129*** (0.014)	0.129*** (0.014)	0.114*** (0.014)	0.114*** (0.014)
Social support	0.086*** (0.017)	0.007 (0.017)	0.086*** (0.017)	0.086*** (0.017)	0.007 (0.017)	0.006 (0.017)
<i>Interactions</i>						
Job demands*Control			-0.009 (0.013)		0.014 (0.013)	
Jon demands* Social support				0.007 (0.016)		0.026 (0.016)
Constant	-2.460*** (0.132)	-2.660*** (0.148)	-2.782*** (0.098)	-2.793*** (0.102)	-2.618*** (0.098)	-2.713*** (0.180)
Log likelihood	-27913.882	-26104.228	-27913.653	-27913.795	-26103.767	-26102.782
Between-class variance	0.294 (0.062)	0.604 (0.141)	0.299 (0.058)	0.296 (0.061)	0.599 (0.094)	0.543 (0.172)
Number of level 1 units	60250	60250	60250	60250	60250	60250
Number of level 2 units	20	20	20	20	20	20

Note: Standard errors in parentheses. As controls, each trust regression contains the full list of variables from the trust base model. We use STATA *predict* option for factor analysis to create a single measure for each of the three components. This option allows capturing the commonalities in the variation of sub-measures selected for the analysis and combining them into a single construct. The single measures are believed to better reflect the rationale behind each of the job strain model facets. The values for the single measures are rescaled to vary between zero and one, with higher values reflecting less job demands, less control and more social support in the workplace.

*** p<0.01, ** p<0.05, * p<0.1 (two-tailed tests).

APPENDIX C. Controlling for Additional Properties of Workplaces.

VARIABLES	Trustworthiness			Caution		
	(1)	(2)	(3)	(1)	(2)	(3)
<i>Job demands</i>						
Working hours	-0.447*** (0.102)	-0.422*** (0.102)	-0.830*** (0.116)	-0.652*** (0.107)	-0.614*** (0.107)	-1.069*** (0.121)
Task complexity	0.286*** (0.069)	0.545*** (0.067)	0.423*** (0.071)	0.038 (0.073)	0.288*** (0.071)	0.119 (0.075)
Job sector Private	-0.225*** (0.024)	-0.225*** (0.024)	-0.239*** (0.025)	-0.299*** (0.025)	-0.297*** (0.025)	-0.314*** (0.025)
Job sector Non-profit	0.045 (0.060)	0.043 (0.060)	0.058 (0.061)	0.090 (0.062)	0.087 (0.062)	0.098 (0.064)
<i>Control (over)</i>						
Sequence of tasks	0.121* (0.063)	0.160** (0.063)	0.176*** (0.064)	0.152** (0.066)	0.181*** (0.066)	0.189*** (0.067)
How to do work	0.182*** (0.066)	0.184*** (0.065)	0.167** (0.066)	0.190*** (0.069)	0.188*** (0.068)	0.193*** (0.069)
Speed of working	-0.135** (0.061)	-0.207*** (0.060)	-0.179*** (0.061)	-0.114* (0.063)	-0.189*** (0.063)	-0.154** (0.064)
Working hours	0.191*** (0.047)	0.234*** (0.047)	0.203*** (0.048)	0.152*** (0.049)	0.189*** (0.048)	0.179*** (0.049)
<i>Social support (through)</i>						
Learning from coworkers and supervisors	0.235*** (0.049)	0.145*** (0.048)	0.206*** (0.049)	0.031 (0.051)	-0.059 (0.051)	0.006 (0.051)
Cooperating with others	0.035 (0.046)	-0.073 (0.045)	-0.061 (0.046)	0.049 (0.047)	-0.053 (0.047)	-0.029 (0.048)
Sharing work-related information	0.130** (0.060)	0.203*** (0.059)	0.207*** (0.061)	0.021 (0.062)	0.087 (0.061)	0.094 (0.062)
<i>Additional controls</i>						
Intelligence level	1.676*** (0.104)			1.590*** (0.109)		
Satisfaction with job		-0.098*** (0.014)			-0.121*** (0.015)	
Income			0.077*** (0.011)			0.089*** (0.011)
Log likelihood	-27698.420	-27805.970	-26838.680	-25949.228	-26022.880	-25114.190
Between-class variance	0.280 (0.067)	0.333 (0.044)	0.314 (0.049)	0.508 (0.125)	0.525 (0.167)	0.535 (0.168)
Number of level 1 units	60250	60242	57545	60250	60242	57545
Number of level 2 units	20	20	20	20	20	20

Note: Standard errors in parentheses. As controls, each trust regression contains the full list of variables from the social trust base model. In column (1), we additionally control for the individual's cognitive abilities measured by averaging the cognitive test results in the areas of literacy and numeracy. Each of the two constructs is calculated as a mean of the ten possible values that the PIAAC survey provides. In column (2), we additionally control for the respondent's job satisfaction measured from 1 "extremely satisfied" to 5 "extremely dissatisfied". In column (3), we additionally control for the respondent's income level operationalised through the question asking individuals to specify the decimal to which their yearly income belongs.

*** p<0.01, ** p<0.05, * p<0.1 (two-tailed tests).