How Differences in Perceptions of Own and Team Performance Impact Trust and Job Satisfaction in Virtual Teams

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ABSTRACT

Employees frequently engage in social comparison processes and have a tendency to perceive their own performance as superior compared to that of their peers. We expect this to be particularly salient in virtual teams where employees receive few cues upon which the comparison with their team members can be based. With reliance on social exchange theory, we propose that such 'perceived overperformance' has negative effects on individual job satisfaction which are mediated by individual trust in team. We confirm this with a sample of field-service employees (753 employees, 57 virtual teams) using structural equation modelling and bootstrapping. We corroborated our findings in focus groups which suggest the need for performance indicators that are easily and comprehended by employees to maintain trust and satisfaction.

Keywords: Performance perceptions, trust in team, job satisfaction, social comparison, social exchange theory

INTRODUCTION

An increasing reliance on work teams is a long lasting, dominant trend within organisations: Already in the 1990s, 88% of the Fortune 1000 relied on teams (Lawler, Mohrman, & Ledford, 1992) that are defined in terms of common task objectives, interdependent tasks and collective task outcomes (Kozlowski & Ilgen, 2006). Teams have traditionally been associated with a number of benefits as compared to more bureaucratic forms of organizing (Guzzo & Dickson, 1996) including a higher quantity and quality of generated ideas, improved problem solving and increased commitment to decisions (Maier, 1967). These benefits may result in enhanced organisational productivity and performance (Applebaum & Blatt, 1994; Levine & D'Andrea Tyson, 1990). Due to advances in information technology, organisations have recently begun to implement so-called virtual teams: Virtual teams differ from traditional work teams in regard to the spatial distance between team members and an extensive reliance on digital communication technologies (Bell & Kozlowski, S. W. J., 2002). Therefore, virtual teams have the potential to realise high levels of flexibility and responsiveness and to reinforce the advantages of conventional teams (Powell, Piccoli, & Ives, 2004): Organisations may assemble their most qualified employees in virtual teams regardless of their

physical location which allows quicker response times (Powell et al., 2004) and maximizes the quality of decisions (Martins, Gilson, & Maynard, 2004). Unsurprisingly, 66% of multinational companies already used virtual teams in 2012 and 80% expected a further increase in the reliance on virtual teams for the near future (Gilson, Maynard, Jones Young, N. C., Vartiainen, & Hakonen, 2014).

Because of the relevance of virtual teams to organisations, our motivation for this study was to provide a novel approach to understanding virtual team effectiveness. As dependent variable of interest we have chosen the team member's level of job satisfaction which is one of the key facets of team effectiveness (Cohen & Bailey, 1997; Kozlowski & Ilgen, 2006). Job satisfaction has received considerable attention by virtual team researchers who identified a number of triggers that may enhance a virtual team member's level of job satisfaction to a degree comparable with that of employees in traditional teams (Gilson et al., 2014). A key interpersonal process that occurs within virtual teams is the level of trust between the team members (Gilson et al., 2014; Martins et al., 2004). For that reason we have chosen trust as our mediating variable of interest. Similar to job satisfaction, trust within virtual teams has recently been researched extensively (Gilson et al., 2014). Existing evidence shows that virtual teams often rely on swift trust in early stages of their collaboration while communication and feedback seeking become essential in later stages of the team development process (Gilson et al., 2014). As a lot of virtual teams operate in knowledge intensive-settings (Kirkman & Mathieu, 2005), trust plays an important role in enabling the team effectiveness (Malhotra & Majchrzak, 2014). Even though research on trust and job satisfaction in virtual teams is growing steadily, a gap still exists as very little work has explicitly linked a virtual team member's level of trust towards her/his co-workers to his level of job satisfaction. Thus, in the present study we will connect trust as a key interpersonal process with job satisfaction as a key facet of team effectiveness. An even more striking blank spot in the virtual teams' literature is a surprising neglect of social comparison theory: Schiller and Mandviwalla (2007) observed that out of 58 studies on virtual teams included in their review, only one relied on social comparison theory. Greenberg, Ashton-James, and Ashkanasy (2007) noted that hardly any empirical work on social comparison processes in virtual teams existed even though social comparison can be expected to play a pivotal

role in virtual teams (Conner, 2003). The present study fills this gap by asking the following research question: What are the effects of social comparison processes on virtual team members' trust and job satisfaction? In order to answer this question and address the identified research gaps, we will apply an Input-Mediator-Output-Input (IMOI) framework (Ilgen, Hollenbeck, Johnson, & Jundt, 2005) as the context for our contribution: We assume that the social comparison processes (inputs) in which team members compares their perception of their individual performance with their perception of the overall team performance affect their level of trust towards each other (mediator) which impacts on their level of job satisfaction (output). This framework is theoretically grounded in social exchange theory. Just as social comparison theory, social exchange theory is concerned with the interaction of individuals within organisations. Whereas social comparison theory concentrates on the comparison processes between these individuals, social exchange theory puts its focus on the exchange relationships that emerge between these individuals. In the remaining of the paper we will argue that social comparison processes influence social exchange processes: The result of a social comparison process of one individual with another will impact on his willingness to engage in an exchange relationship with that co-worker and affect her/his level of trust and job satisfaction.

We believe that research on social comparison processes in virtual teams is important for a number of reasons: First, social comparison processes are an omnipresent organisational phenomenon (Mumford, 1983). The comparison of one's own abilities with those of others is a fundamental human need to get to know one's own relative position (Festinger, 1954) and organisations offer plenty opportunities for their employees to compare themselves with each other (Goodman & Haisley, 2007). Second, social comparison processes play an even more important role in virtual teams than in other organisational contexts (Conner, 2003; Greenberg et al., 2007). Social comparisons are essentially a strategy to reduce uncertainty (Buunk, Schaufeli, & Ybema, 1994; Wood, 1996) and virtual teams are characterized by high level of uncertainty (Tangirala & Alge, 2006). Thus, virtual team members will engage in social comparison processes frequently. However, as they have less information available on which they can base their comparison process as compared to face-to-face settings (Greenberg et al., 2007), they will frequently come to biased conclusions. As we will discuss

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and test in the remaining of this paper, this might adversely affect their levels of trust and job satisfaction. Third, social comparison processes offer incremental validity in predicting employee attributes (Brown, Ferris, Heller, & Keeping, 2007). For that reason, social comparison theory should add value to the study of virtual teams.

In the next section we will build the theoretical foundations for our paper. We will begin by describing the basic social comparison process and discuss its relevance in virtual team settings. Subsequently, we will use social exchange and social comparison theory to derive hypotheses regarding the effects of social comparison on trust and job satisfaction.

SOCIAL COMPARISON, TRUST AND JOB SATISFACTION

Social Comparison Processes

Following Festinger (1954), humans have an inherent need to evaluate their opinions and abilities. In order to do so they engage in social comparison that can be defined as the "process of thinking about information about one or more other people in relation to the self" (Wood, 1996, p. 520). For employees who operate in teams, objective information about performance is frequently not available which is why they compare their own perceived performance with their impression of the overall team performance to get an indication of their relative position (Mumford, 1983). There are two explanations why a team member may conclude from this comparison that her/his own performance is superior: First, the team member might have chosen inferior target referents whose performance is actually worse than her/his own and regard them as representative of the whole team. Such *downward* comparisons might happen deliberately or passively and usually are a direct response to a negative event (Wills, 1981). A prominent example for this is the behaviour of women who have to adjust to the diagnosis of breast cancer (Wood et al., 1985). Second, the team member may have fallen short of the so-called better-than-average effect. As humans have a unidirectional drive *upwards* (Festinger, 1954), they will mainly compare their own performance with referents who appear to show slightly higher performance. Based on this ongoing comparison with superior referents, people end up perceiving their own performance as actually better than the average referent's performance (Jellison

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& Riskind, 1970). Research found that this better-than-average effect is particularly salient when the target referent is distant and no personal relationship with the target exists (Alicke, Klotz, Breitenbecher, Yurak, & Vredenburg, 1995; Matz & Hinsz, 2000). Virtual teams are an example for such a setting. Following the conceptualisation by Kirkman and Mathieu (2005), in teams that face a high degree of virtuality, communication is mainly restricted to digital, asynchronous means (e.g. e-mail) with low informational value. This implies limited feedback by the supervisor as well as limited social bonds between the team members. This may result in biased perceptions of the own performance (due to limited feedback by the supervisor) as well as of the team performance (due to limited interactions with the team) (Conner, 2003; Greenberg et al., 2007). In addition, it can be assumed that virtual team members engage in social comparison processes frequently as the level of role ambiguity and uncertainty is higher compared to traditional face-to-face teams (Brown et al., 2007). Based on these thoughts - 1) biased comparison processes that 2) occur frequently - social comparison appears to play an important role in virtual teams. In order to address our research question, we will now use social exchange and social comparison theory to derive hypotheses in regard to the effects social comparison has on virtual employee attributes.

The Social Comparison – Job Satisfaction Link

Job satisfaction can be defined as a virtual team member's "positive emotional state resulting from the appraisal of [her/his] job or job experiences" (Locke 1976, p. 1300). We have chosen job satisfaction as the dependent variable as it is traditionally considered as a key facet of team effectiveness (Cohen & Bailey, 1997; Kozlowski & Ilgen, 2006). As we discuss in the following, high levels of job satisfaction are also seen as an outcome of successful social exchange relationships. Social exchange theory emphasizes the assumption of reciprocal interdependence (Blau, 1964) which results from ongoing interactions (Emerson, 1976) between two or more parties. This reciprocal interdependence implies that one party reacts upon the actions of another (Molm, 1994). If someone for example has been supplied with an economic or quasi-economic benefit, this person should respond in the same way (Gergen, 1969) and within a particular time period (Clark & Mills, 1979).

Within the team context, two kinds of exchange relationships can be distinguished: That between the individual and her/his supervisor (leader-member-exchange) and that between the individual and her/his team (team-member-exchange). The latter construct has been introduced by Seers (1989) and represents the quality of reciprocal exchange between team members. Maslyn and Uhl-Bien (2001) argued that reciprocity alone does not suffice for high-quality exchanges. The relative effort exerted by both parties does also matter – if one individual perceives that she/he invests high effort while her/his exchange partner invests considerably less, this leads to a lower quality exchange relationship. If a team member has a positive attitude towards her/his team members, this has positive effects on her/his level of job satisfaction (Tse & Dasborough, 2008). Based on a recent meta-analysis, Banks and colleagues (2014) reported a moderate correlation of .43 between team-member exchange quality and individual job satisfaction. In addition, they found that team member exchange showed incremental validity above and beyond the classic leader member exchange construct in predicting job satisfaction. In investigating the relationship between social comparison and job satisfaction, Brown et al. (2007) revealed that the frequency of upward comparisons is negatively related to job satisfaction whereas the frequency downward comparisons is positively related to job satisfaction. In addition, they found that social comparison explained incremental variance in job satisfaction over and beyond established constructs such as leader-member-exchange and perceived organisational support. Unlike Brown et al. 2007, in this study we will not look at the frequency in which team members engage in either upward or downward comparison but concentrate on whether a team member concludes from the social comparison process that her/his own performance is superior or inferior compared to the overall level of team performance. In particular, we assume based on social exchange theoretic insights that a team member has lower levels of job satisfaction when the team member perceives her/his own performance to be superior compared to her/his perception of the overall team performance: First, the team member is dissatisfied because she/he thinks that the other team members have invested less effort than he/she has (Maslyn & Uhl-Bien, 2001). Second, the team member perceives the norm of reciprocity to be violated because from her/his point of view he/she has contributed more to the team than the remaining team does (Gergen, 1969). Both effects combined form our first hypothesis:

Hypothesis 1: A virtual team member who perceives her/his own performance to be superior compared to her/his perception of the overall team performance has lower levels of job satisfaction.

The Social Comparison – Trust Link

As in regard to job satisfaction, social comparison processes can be expected to impact on the development of trust in virtual teams. Prior research on virtual teams has identified trust a key process that occurs in these settings. For that reason we have chosen trust as our mediating variable of interest. Employees are able to distinguish between different trust foci, i.e. trusting the organisation, the top management, their direct supervisor or their fellow team members (Fulmer & Gelfand 2012). In this paper we concentrate on the trust an individual in a virtual team holds towards her/his fellow team members. This form of trust can be defined as the willingness of an individual team member to be vulnerable towards her/his fellow team members based on the positive expectation that her/his team members will not take advantage of her/his situation (c.f. Mayer , Davis, & Schoorman, 1995; Rousseau, Sitkin, Burt, & Camerer, 1998). Since Blau's (1964) early work on social exchange theory, trust has frequently been identified as a key outcome of high quality exchange relationships (e.g. Tse & Dasborough, 2008). Fulmer and Gelfand (2012) reviewed 375 studies on trust and found that a large fraction of these relied on social exchange theory and explained interpersonal trust as resulting from the inputs and outputs of the exchange relationship with the trust referent. These studies frequently found that a lack of trust resulted from an imbalance in the exchange (e.g. Ambrose & Schminke, 2003; Aryee, Budhwar, & Chen, 2002; Khazanchi & Masterson, 2011). Team members might note such an imbalance when they perceive their own performance as superior compared to their perception of the overall team performance and accordingly the trust they hold towards the team may decline. Hence, just like job satisfaction, trust is a variable that has strong associations with social comparison theory.

Social comparison theory provides a further explanation for this reduction in trust: Social comparison has at its core the evaluation of a referent's abilities in regard to one's own abilities (Festinger, 1954). In that regard, recent research found downward comparisons to have negative

effects on trust which were mediated by beliefs about ability (Dunn, Ruedy, & Schweitzer, 2012). This explanation is derived from the classic trust model by Mayer and colleagues (1995) that posited that trust develops from an assessment of the referent's trustworthiness in terms of ability, benevolence and integrity. In the case of downward comparisons, the target referent is considered to have lower abilities and is therefore deemed less trustworthy. The assessment of the referent's trustworthiness is central in the trust development process because it builds the foundation for the cognitive side of trust (Lewis & Weigert, 1985). The cognitive base of trust itself is required for actually expressing trusting behaviour (McAllister, 1995). Accordingly, the result of the social comparison process that assumes the referent to have lower abilities is less trust. Combining the insights from social exchange theory (an unbalanced exchange) and social comparison theory (weaker belief about ability), we state our second hypothesis as follows:

> *Hypothesis 2: A team member who perceives her/his own performance to be superior compared to her/his perception of the overall team performance has lower levels of trust towards her/his virtual team.*

Trust as Mediator of the Social Comparison – Job Satisfaction Relationship

Some level of interdependence is a defining element of both, team work (Kozlowski & Ilgen, 2006) and social exchange (Molm, 1994). Because of this interdependence, team members cannot avoid interacting with each other. With trust towards her/his fellow team members, an employee enters these interactions holding positive expectations. This facilitates willing cooperation and increases the probability that the interdependence and interactions with the other team members are perceived in a positive way. As interdependence and interactions are core elements of a virtual team member's job, her/his level of trust towards the fellow team members should impact on her/his level of job satisfaction. (This is in line with a number of empirical findings (Fulmer & Gelfand, 2012, for a review). As an example, McNall (2009) found that trust in the manager was significantly positively related to job satisfaction. Similarly, apart from being a direct cause of job satisfaction, Braun and her colleagues (2013) found that trust in leaders mediated the effect of leadership perceptions on job satisfaction. The role of trust as critical mediator has also been revealed by Yang, Mossholder and

Peng (2009) in regard to the effects of supervisory procedural justice on performance and job satisfaction that were mediated by cognitive trust in the supervisor. Related to that, research already revealed that trust plays a key mediating role in ongoing close relationships (Rempel, Holmes, & Zanna, 1985; Rempel, Ross, & Holmes, 2001; Wieselquist, Rusbult, Foster, & Agnew, 1999). Our third and final hypothesis is stated in accordance with that.

>*Hypothesis 3: The negative effect social comparison processes have on job satisfaction are mediated by individual trust towards the virtual team.*

Figure 1 summarizes the proposed relationship among the variables.

METHODS

Sample and Procedures

The data for this study were collected as part of a larger research project on virtual work relationships. Participants were recruited among technical field-service employees of a large German telecommunications company as part of corporate-sponsored leadership development program conducted by the first author. Technical field-service employees spend most of their working time at the client which restricts their communication with colleagues and supervisor mainly to virtual means. Therefore, technical field-service teams can be considered as good example for virtual teams. Prior to the data collection, we discussed all items with the management board and the union representatives of the organization. We used an online survey together with an encryption technique to anonymize the respondents' identity and team membership. The organisation's technical field-service division consisted of 60 teams each comprising 20 employees. To be included in the analysis, at least five members of the team had to complete the survey. After five weeks of data collection, 57 of the 60 teams could be included representing 753 employees. This is equivalent to a very satisfactory response rate of 95% at the team level and 63 % at the individual level with a mean response per team of 13.2 employees (median: 13, mode: 14). The average respondent was male, aged 45-49, worked for the company for about 25 years, and knew her/his team members for more than 10 years[1].

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The degree of virtuality of each team was reported by the respective team leader in terms of degree of digital communication, degree of asynchronous communication and informational value (Kirkman & Mathieu, 2005) using 5-point scales. The teams in our sample were characterized by medium to high levels of virtuality. For the amount of informational value delivered in the communication the mean was 2.50 (sd = .90), for the degree of asynchronicity of the communication the mean was 2.82 (sd = 1.14) and for the degree of digital communication the mean was 3.51 (sd = 1.15). Accordingly, technical field service in fact appears to be a good example for virtual team contexts.

Prior to the data collection, all measures were checked in a pre-test with 10 respondents, three of which were employed in the same research centre as the first author and familiar with the topic of interest. Two respondents worked in the organisation in which the research was conducted and the remaining five respondents worked in different settings. In addition, we conducted three interviews with virtual team leaders in the telecommunications company in which we discussed each item and made minor changes to the wording of the questions in order to maximize the comprehensibility of our questionnaire.

Lastly, after completion of the data analysis we conducted a series of focus groups (5 focus groups with 10 team leaders and 1 focus group with 20 team leaders) to corroborate our results. Each focus group took between 90 and 150 minutes. Here we discussed our empirical findings and used the feedback and input of the team leaders to derive the implications for managerial practise.

Measures

Social comparison construct

We took a three-step approach and first assessed the team members' perception of their individual performance followed by their perceptions' of the overall team performance. We then used both measures to compile a composite measure that we finally used as our social comparison construct. The next paragraphs report our approach in more detail and give further social comparison theoretical explanations.

Step 1: Perceptions of individual performance: We assessed employees' perceptions of their own performance along three dimensions: first, the level of productivity, second, the degree of customer satisfaction and third, the revenues generated by selling additional services such as software support. These dimensions were identified by the management of the organisation as key performance indicators. By using used a 5-point scale anchored at the extremes with "clearly below the set target value" and "clearly above the set target value" we referred to the objective and measurable understanding of performance articulated by the organisation (e.g.: "I perceive my own performance regarding the level of productivity as …"). Such perceptual performance measures appear to have better psychometric properties than archival performance ratings (Wherry & Bartlett, 1982; Schriesheim et al. 1998, 1999).

Step 2: Perceptions of overall team performance

Next, we posed the same three questions this time asking for perceptions of team performance (e.g. "I perceive the performance of my entire team regarding the level of productivity as …").

Step 3: Composite measure of perceived performance difference

To conceptualise the difference employees perceive between their own performance and that of their entire team, we subtracted ratings of team performance from the ratings of individual (own) performance. Values for the resulting difference variables ranged from -4 to 4. Positive values accounted for instances in which the respondents perceived their own performance as being superior compared to the team performance. We subsumed these three difference variables to one factor that reached an alpha of .64. This reliability level can be deemed satisfactory given that our conceptualisation of social comparison is a novel construct (Nunnally, 1978).

Social comparison theoretical explanation for conceptualisation: Our choice of variables has been informed by the work of Moore (2007a, 2007b) on social comparison theory. Based on Mooore's work, our procedure overcomes two caveats that may distort the results: First, we independently assessed the self-rating and the referent-rating instead of directly asking the respondents to indicate their own performance relative to the team. Second, we relied on a relatively

objective instead of subjective verbally-anchored scale (i.e. very bad to very good). Both procedures minimize the potential for overestimating the actual effect of social comparison. In addition our conceptualisation of social comparison has advantages over those used in a lot of previous studies on social comparison processes that typically use manifest variable approaches in which both independent and dependent measures are based on a single-indicator. This approach erroneously assumes that all measured variables are measured without measurement error. Not considering measurement error either artificially increases or decreases a given path coefficient and accordingly biases the results (Marsh et al., 2010). For that reason, we measured both our independent variable (the social comparison construct) as well as the dependent variables (trust and satisfaction) using multiple item scales. Finally, the explanation for our procedure rests in the nature of virtual teams: Members of virtual teams have few direct interactions with their fellow team members and have very rare occasions to observe each other directly at work. This makes it hard for them to compare themselves with specific other individuals in their team. Based on these thoughts, we assume that employees in virtual teams will seldom select a specific superior referent in their team for upward comparisons or a specific inferior referent for downward comparison. Instead, they will mainly compare their own performance with that of the entire team because the feedback by the team leader on the overall team performance will usually be the only information available for social comparisons. To sum this up: The social comparison processes that assumably dominate in virtual teams are those between the team members' perceptions of their individual performance with their perceptions of the entire team performance. For that substantial reason and due to statistical concerns we followed exactly that approach in our conceptualisation of the social comparison construct in our study.

Individual trust in team. Research grounded in social exchange theory and more general research on virtual teams has identified trust as key mediating variable. We followed that understanding and assessed trust in team with the five item scale ($\alpha = .91$) developed by De Jong & Elfring (2010).

Individual job satisfaction. Job satisfaction has been identified by social exchange theory as important result of exchange relationships and research on virtual teams named it as key facet of

virtual team effectiveness. This informed our choice of job satisfaction as dependent variable of interest that was measured with the three-item scale ($\alpha = .75$) developed by Hackman and Lawler (1971).

Additional antecedents of trust in team and job satisfaction. In order to maximize the validity of our findings we adopted Brown's et al. (2007) approach and included two further antecedents of trust and job satisfaction into our study. Brown et al. (2007) pointed out that research on social comparison processes in organisation is yet an emergent field. This applies even more to the context of virtual teams (Greenberg et al., 2007). Therefore, Brown et al. (2007) suggest including constructs that have already been established in predicting the outcome variable of interest to check whether the nascent social comparison constructs have incremental predictive validity. In our study, we assessed the unique contribution of social comparison by including two antecedents that previous research has related to trust and job satisfaction: Interpersonal justice and informational justice as the two distinctive dimensions of interactional justice. Interpersonal Justice is defined as "the degree of respect and propriety authority figures use when implementing procedures" and informational justice refers to "the degree of justification and truthfulness offered during procedures" (Colquitt & Rodell, p. 1183). Meta-analytic evidence (Dirks & Ferrin, 2002) exists for the effect of interactional justice on trust in the leader ($\rho = .65$) and more related to our study, a prominent meta-analysis demonstrated that both dimensions of interactional justice were positively and significantly related to job satisfaction ($\rho = .35$ for interpersonal justice and $\rho = .43$ for informational justice) (Colquitt, Conlon, Porter & Ng; 2001). Hence, interpersonal justice and informational justice were modelled as antecedents to reveal whether our conceptualisation of social comparison has incremental validity in predicting trust in team and job satisfaction. Interpersonal Justice was measured using a four-item scale ($\alpha = . 94$) and informational justice was assessed with a five-item scale ($\alpha = . 91$) from Colquitt (2001).

Control variables. Age was measured using a 10-point scale from 1 (younger than 20 years) to 10 (older than 60). Education was measured on a six-point scale from 1 (without secondary school qualifications) to 6 (university degree). Job complexity was measured on a five-point scale from 1

(very simple task) to 5 (very complex task). Finally, we measured tenure in various ways (tenure with organisation, tenure with the supervisor, tenure with team members, length of relationship with the supervisor and length of relationship with team members) all using a 12-point scale from 1 (less than one year) to 12 (more than 10 years).

Appendix A contains an overview of all items used in this study.

Analyses

We relied on AMOS 22 with maximum likelihood estimation to analyse the fit of our research model (Arbuckle &Wothke, 1999). As suggested by Byrne (1998), we followed a two-step approach and first checked the fit of the measurement model before testing the hypotheses underlying our structural model. More specifically, confirmatory factor analysis (CFA) was employed to identify that measurement model that had the best fit with the data. Then, we used the identified measurement model to test our hypotheses in the structural equation model (SEM). To determine model fit we relied on a range of fit indices, including root mean square error of approximation (RMSEA; Browne & Cudeck, 1993), the comparative fit index (CFI; Bentler, 1990) and the Tucker–Lewis index (TLI; Tucker & Lewis, 1973). As cut-off values for adequate model fit we used an RMSEA close to zero and the CFI and TLI of .90 or higher. Finally, we used bootstrapping to test the mediating role of trust in team proposed in hypothesis 3.

RESULTS

Relations among the Measures

As an initial step in our analysis, we checked the interclass correlation coefficients (ICCs, see Table 1) to see whether a multi-level analysis should be conducted by including a higher-level team factor. As the ICC values for each of our three constructs were sufficiently low (ranging from .02 to .1) the analysis could be conducted at the individual level (Aguinis, Gottfredson, & Culpepper, 2013). Next, we inspected the bivariate correlations (see table 2) which are in line with our hypotheses: Perceived overperformance was negatively related to trust in team (r = -.37, p < .01) and job

satisfaction (r = - .13, p < .01) and trust in team had a positive correlation with job satisfaction (r = .39, p < .01). Additionally, as suggested by previous research the two dimensions of interactional justice were significantly and substantially related to both trust in team and job satisfaction (r ranges from .33 to .47, all p < .01).

################Insert TABLE 1 here ################

################Insert TABLE 2 here ################

Measurement Model

Next, we compared the fit of the hypothesized five-factor model, with an alternative four-factor model consisting of a) performance difference, b) trust in team, c) job satisfaction and d) a global scale for interactional justice, and a one-factor model, incorporating all constructs in one factor. As shown in table 3, the five factor model fit the data significantly better than the alternative four-factor model and the one-factor model. However, we constructed a modified four-factor model based on the inspection of modification indices that suggested that two error terms of the 'trust in team' construct should be correlated with each other. Furthermore, interpersonal justice was dropped from the model and only informational justice was retained because this construct had higher correlations with the dependent variables. The resulting model had a very good fit with the data (CFI = .99, TLI = .98, RMSEA = .04) and fit the data significantly better than all previous models.

The CFA results also indicated that all constructs were reliable and valid. Composite reliability was given for all constructs (Bagozzi & Yi, 1988). For job satisfaction and overperformance the average variance extracted (AVE) was below the threshold of .5. An additional explorative factor analysis however suggested that all items loaded only on one respective factor. The variance explained was 69 % for job satisfaction and 59 % for performance difference. Discriminant validity was given for all constructs (Fornell & Larcker, 1981).

Structural Model

The average indicator loading of the factors in our model was .80 and the total model had a very good fit with the data. The model had a RMSEA of .04, which is below Hu and Bentler's (1999) recommended value of .06. The model had a CFI of .99 and a TLI of .98 also clearly exceeding the desired level of .90. Only the chi-square test was statistically significant, $Chi2(98, N = 753) = 192.68$, $p < .01$ but this statistic is sensitive to sample size so that scholars (e.g. Maruyama, 1998) recommend as an alternative to inspect the chi-square to degrees of freedom ratio which also suggested a very good fit ($Chi2/df = 1.97$) for our model. As shown in Figure 1, all direct paths were significant and of substantial size (Cohen, 1988) except for the path from performance difference to job satisfaction. This is in line with the supposed mediation effect in H3. To test for mediation, we used bootstrapping and examined the indirect effect of social comparison through trust in team on job satisfaction (see Table 4). Specifically, we resampled 2,000 times and applied the bias-corrected percentile method to build 95% confidence intervals (Shrout & Bolger, 2002). The resulting indirect effect was significant ($r = -.09$, $p < .01$) indicating that trust in team in fact mediates the negative effect of social comparison on job satisfaction. Regarding variance explained, performance difference and informational justice accounted for 32% of the variance in trust in team, and performance difference, trust in team and informational justice accounted for 25% of the variance in job satisfaction. Importantly, performance difference explained criterion variance over and above the significant effects of informational justice indicating that social comparison in fact has incremental predictive validity in regard to trust and job satisfaction. Taken together, the results of the latent variable modelling support all three hypotheses and confirm that social comparison processes have incremental validity in predicting employee attributes.

################Insert TABLE 3 here ################

################Insert TABLE 4 here ################

################Insert FIGURE 1 here ################

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We will now continue with a discussion of our findings and show how they relate to theory and praxis.

DISCUSSION

Our research was motivated by the apparent neglect of social comparison processes by research on virtual teams. In addition, limited empirical evidence so far exists for the specific link between trust in the team and global job satisfaction. Based on this, the purpose of our study was to provide a novel approach to virtual team effectiveness by addressing the following research question: What are the effects of social comparison processes on virtual team members' trust and job satisfaction? Our empirical investigation has generated a number of answers to this question: First, perceived overperformance has negative effects on a virtual team member's level of trust towards her/his team and her/his level of job satisfaction. Second, the social comparison processes actually have incremental predictive validity in explaining these employee attributes. Third, a virtual team member's level of trust towards his team impacts positively on her/his level of job satisfaction. Fourth, trust mediates the negative effect of social comparison processes on job satisfaction. In the following we discuss in detail, how each of this finding enhances our understanding of virtual teams and more generally of employee attributes.

First, regarding the negative effects of perceived overperformance on employee attributes, our study provides new insights into the nature of virtual teams. Despite their relevance (Greenberg et al., 2007), research in this field has ignored social comparison processes (Conner, 2003; Schiller & Mandviwalla, 2007). Our study reveals a so-called contrast effect (Buunk & Gibbons, 2007) that occurs in virtual teams: Team members who conclude that their own performance is superior compared to their perception of the overall team performance distance themselves from the team and accordingly express less trust and are less satisfied with their job. Hence, the social comparison results in a contrast effect where the focal person distances himself from the referent (Buunk & Gibbons, 2007). This relates to previous research on social comparison processes and employee attitudes: Brown et al. (2007) found that the frequency in which employees engage in social comparison processes that lead to contrast effects negatively influence their level of job satisfaction. The size of

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the effect reported in their study (r = -.17) is similar to our finding. The size of the indirect effect of social comparison on job satisfaction through trust (r = .08) we found may appear small but we are confident that the influence of social comparison processes in virtual teams is actually substantial. First, we applied very conservative measures in conceptualising social comparison (multiple-item scales, independent assessment of own and other performance perceptions and objectively anchored scales) to ensure that we do not overestimate the actual effect of social comparison. Second, the effect of social comparison on trust in team is substantial (r = -.33). This pattern reveals a potential thread to virtual team effectiveness. Trust is key interpersonal process that is linked to a full range of desirable outcomes such as knowledge sharing (e.g. Golden & Raghuram, 2010; Levin & Cross, 2004) and the phenomenon of perceived overperformance may undermine trust substantially.

Second, our research confirmed that social comparison processes actually provide new insights into understanding trust and job satisfaction: The phenomenon of perceived overperformance predicted job satisfaction and trust beyond the established construct informational justice. This connects to Brown et al. (2007) who were the first to demonstrate the incremental predictive validity of social comparison in regard to commitment and job satisfaction. Both, the present study and the research by Brown and colleagues shows that social comparison processes actually add value to the employee attributes. This is an important observation as research on the effect of social comparison processes on employee attributes has been extremely limited (Buunk & Gibbons, 2007). Our study should therefore be regarded as an encouragement to conduct more research on social comparison and employee attributes.

Third, our study provides new insights into the relationship between trust and job satisfaction. Based on social exchange theory, we argued that the specific level of trust an individual holds towards her/his team should impact on her/his overall level of job satisfaction. The identification of this spill-over effect from a team level variable (trust) to an individual level variable (job satisfaction) is in line with a recent call by Fulmer and Gelfand (2012) to identify such spill-over effects in order to advance the maturing field of trust research. The fact that we found this effect in our specific sample of technical field service team relates to research on virtual teams. Existing empirical work concluded

that virtuality is principally negative for the development of trust as virtual communication delivers less behavioural and social cues on which trust can be built (Wilson, Straus, & McEvily, 2006). This effect however diminishes over time as employees in virtual teams get used to virtual communication (Alge, Wiethoff, & Klein, 2003; DeRosa, Hantula, Kock, & D'Arcy, 2004). Once trust is established, research has pointed out that it may play a pivotal role as trust has for example been linked to virtual team adjustment (Raghuram, Garud, Wiesenfeld, & Gupta, 2001). Our study adds to that line of research by demonstrating that in established virtual teams - characterized substantial relationship length among team members – the level of trust a virtual team member holds towards her/his team is positively related to her/his level of job satisfaction. Here, our study has a certain advantage over a lot of existing work on virtual teams that relied on artificial student samples (e.g. Jarvenpaa, Knoll, & Leidner, 1998; Piccoli & Ives, 2003; Wilson, Straus, & McEvily, 2006) whereas we were able to collect data on actual, established virtual teams in the field.

Finally, our identification of trust in the team as mediating mechanism relates and adds to previous work in the field of social exchange. We replicated the pattern of existing studies that trust acts as the key mediator in exchange relationships (Cropanzano & Mitchell, 2005). Our results conform to the principles of social exchange theory that emphasize the norm of reciprocity and the perception of relative effort (Maslyn & Uhl-Bien, 2001). A team member who considers her/his own performance as superior compared to her/his team may either infer that the remaining team members do not adequately reciprocate her/his contributions to the team or the team member perceives that the other team members invest less effort than he/she is doing. In either way the team member perceives the exchange relationship with her/his team in imbalance which erodes her/his attitude towards the team and decreases her/his level of trust towards the team.

Strengths and Limitations

Our study has some advantages over previous studies in the fields of social comparison and social exchange. We used multiple-item scales for our independent and dependent variables that allow for measurement error (Marsh et al., 2010). We separately assessed perceptions of own and other performance and used objectively verbally anchored scales (Moore, 2007a, 2007b): All of this should

minimize the potential for overestimated effects. As a further strength, we were able to collect our

data in a large sample from a single company so that differences between companies and industries do

not bias our results (Brown et al., 2007).

However, some limitations inevitably remain: First, our measure of job satisfaction appears

somewhat less than ideal. The explanation might be one reversed-coded item that asked the

respondents about their intentions to leave the organisation. The organisation in which we conducted

our research used to be a state-owned agency which is why some employees are still civil servants and

have no intention to leave regardless of their actual level of job satisfaction. Second, we included a

single scale to measure employees' trust towards their team. While this scale had very good

measurement properties, it did not distinguish between cognitive and affective bases of trust

(McAllister, 1995) which would be really useful regarding the origin idea of Festinger (1954) who

took the cognitive side into account. We strongly encourage future research to incorporate such scales

to draw more insightful conclusions regarding the effect of social comparison on trust as well as

regarding the mediating role of trust itself. Third, we note that we merely relied on self-reported data

by the team members. Such self-reported data – particularly regarding the own performance – may be

subject to common method bias. To address that matter we undertook two steps: First, we performed a

Harman one-factor test that loads all items into a principal component factor analysis. As solution, a

five factor structure emerged in which the first factor accounted for 38.7% of the variance. This

indicates that common method bias is unlikely to be present in our study. To corroborate that

conclusion we secondly applied the procedure described by Lindell and Whitney (2001). The results

are included in Appendix B. Lindell and Whitney proposed to add a marker variable to the model that

is theoretically unrelated to at least one variable in the study, ideally the criterion variable. The

correlation between the marker variable and the criterion variable is an estimate for common method

variance and used to to adjust the remaining correlations. In our case the correlation between the

marker variable (monitoring-ask behaviour of the supervisor) and job satisfaction was as low as .02 so

that the common-method bias adjusted correlations are only slightly lower than the correlations

actually reported in our analysis and remain significant. We also conducted a sensitivity analysis to

examine how our correlations change depending on different levels of common method variance. Even for the 99% confidence interval of the correlation between marker variable and criterion variable, the correlations between trust in team and job satisfaction and between informational justice and job satisfaction still had substantial size. Altogether, we can conclude that common method bias should not be a major concern in our study (Podsakoff et. al, 2003, 2012).

Directions for Future Research

Our study opens avenues for future work. First, such studies could consider an employee's exchange orientation as an important individual difference (Clark & Mills, 1979; Murstein, Cerreto, & MacDonald, 1977). Based on prior social exchange theoretic work (Eisenberger, Lynch, Aselage, & Rohdieck, 2004) we assume that the negative effects on trust and satisfaction are more accentuated for employees with high exchange orientation. Second, we invite future work to take a step back and investigate how employees in virtual teams actually come to the view that their own performance is superior compared to that of their entire team. Such view might be caused by downward comparison processes or by the better-than-average effect. As it was out of our focus, we could not clarify which of these two explanations prevails. Future research on virtual teams should address this as there is a lot of ambiguity regarding how employees in virtual teams actually conduct social comparisons and how they pick their referents (Conner, 2003).

Practical Implications

In order to derive reasonable and valid implications for practise, we discussed our findings with all the team leaders whose teams participated in our study. As a format for these discussions we organised five focus group, four comprising 10 team leaders and one comprising 20 team leaders. At the beginning of each focus group, we confronted the team leaders with exemplary figures from our research, for example that 96.6% of their employees perceived their own performance regarding customer satisfaction as either slightly or clearly beyond the set target value which is not at all reflected by actual performance data. Even more striking, every second employee (52.7%) considered her/his own performance as clearly beyond the set target value while only every fourth employee

(24.6%) had this impression about the overall team performance. The latter value was roughly in line with the actual performance data reported by the team leaders. These figures served as a good example that actually a lot of employees were affected by the phenomenon of 'perceived over-performance'. We then explained to the team leaders the potential adverse effects of perceived over-performance on trust and job satisfaction and asked for their input of how the organisation should deal with this issue. The pattern that emerged from the focus groups is as follows: It is essential that team leaders communicate clearly and in a plausible manner how the team on the whole but also how each individual team member is performing. Otherwise, team members may come to biased perceptions of their own performance relative to the team in the way illustrated above. This applies in particular to allegedly soft performance indicators such as customer satisfaction. The individual field-service employee might think that her/his customers are clearly satisfied when he/she merely solved their technical issues. For that reason almost every employee (96.6%) considered her/his individual performance as clearly beyond the set target values. However, solving technical issues is just the minimum requirement for doing the job while the organisation measures the actual degree of customer satisfaction with a complex quantitative performance indicator. If however team leaders only communicate that the overall team performance is below or close to the target value, a large fraction of the employees will think that this cannot be their fault but that instead their fellow team members are to blame. This is the reason, why their trust towards the team declined as was predicted by our data. In virtual work contexts, the potential for such scapegoating is particularly high as the team members almost never observe each other at work to reduce their prejudice that the suboptimal team performance is not their own but their team members fault. The only allegedly objective information on team performance comes from the team leader. If the team members do not understand that information and relate it adequately to their own performance, biased social comparisons and adverse effects on trust and satisfaction are likely. These practical implications can be summarized as follows: First, team leaders have to communicate clearly and in a comprehensible manner how each performance indicator is constituted and what these performance indicators actually refer to. Second, they need to articulate how the team on the whole as well as each individual team member is currently

performing along each performance dimension. Third, the current performance indicators might have to be adjusted to a more intuitive format.

Conclusion

To conclude, this study conforms to and extents previous research in the fields of social comparison and social exchange theory. We were able to show that team members who perceive their own performance to be superior compared to their perception of the entire team performance are less satisfied with their job and hold lower levels of trust towards their team. While our findings need to be generalized by subsequent work, the results point to the need for performance indicators that are easily communicated to and comprehended by virtual employees in order to maintain their levels of trust towards their fellow team members and job satisfaction.

FIGURE 1: Research Model
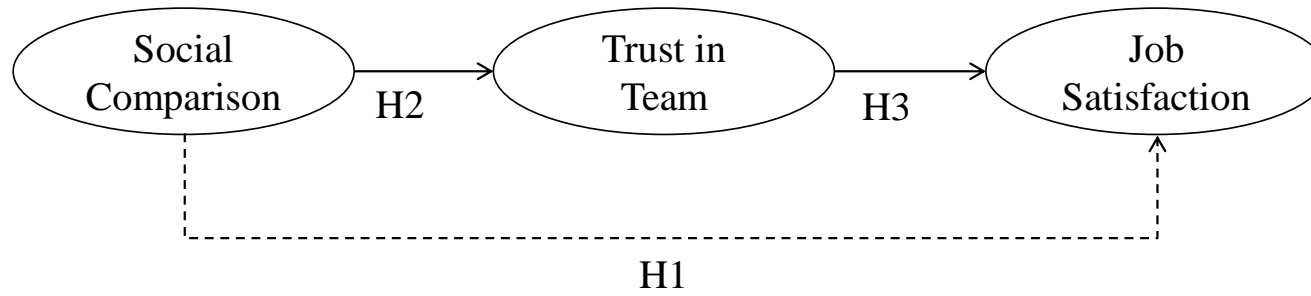
FIGURE 1 Indirect effect of Social Comparison on Job Satisfaction
 through Trust in Team.

FIGURE 2: Parameter Estimates
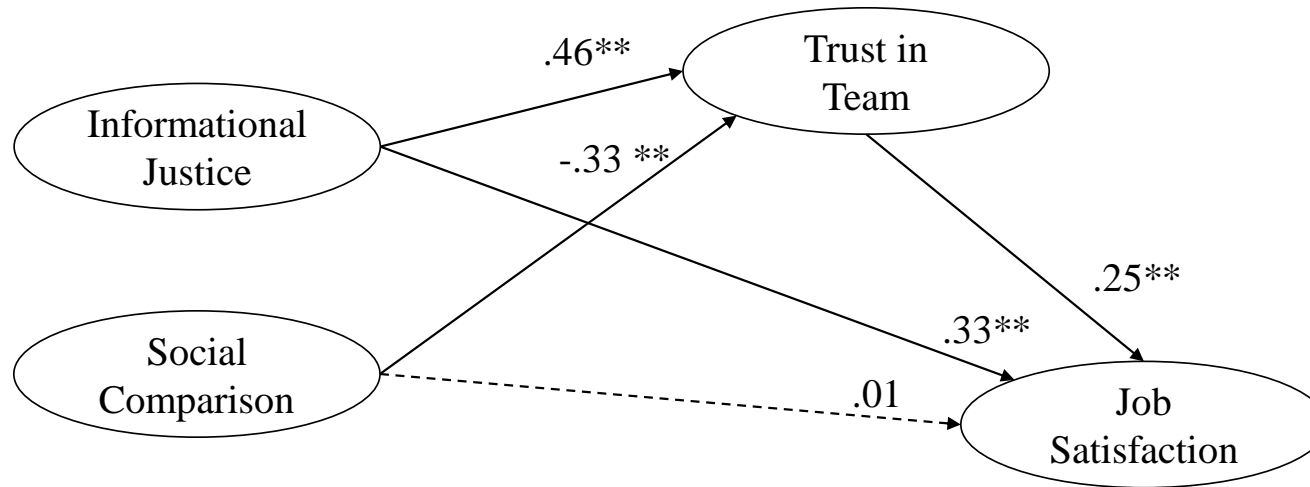
FIGURE 2 Standardized path coefficients for hypothesized model.
**p < .01, one-tailed test.

TABLE 1: Interclass Correlation Coefficients

Variable	Team Size	MS Between groups	MS within groups	ICC(1)	ICC(2)
Performance Difference	11.05	1.94	.91	.09	.53
Trust in Team	11.40	2.04	.90	.10	.56
Job Satisfaction	11.40	1.23	.98	.02	.21

Note. df, degrees of freedom; ms, mean square; ICC, interclass correlation coefficient

TABLE 2: Descriptive Statistics and Correlations

	Measure	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Age	6.65	2.15	-												
2	Education	3.11	0.95	-.48**	-											
3	Organisational tenure	5.99	2.26	.94**	-.51**	-										
4	Job complexity	4.11	0.70	.19**	.01	.19**	-									
5	Relationship length with supervisor	6.74	3.86	.29**	-.13**	.29**	.14**	-								
6	Tenure with supervisor	5.30	3.39	.20**	-.06	.20**	.15**	.72**	-							
7	Relationship length with team members	8.52	3.56	.48**	-.20**	.52**	.27**	.33**	.31**	-						
8	Tenure with team members	7.39	3.94	.37**	-.20**	.39**	.18**	.35**	.44**	,629**	-					
9	Interpersonal justice	4.63	0.75	-.03	-.02	-.01	.05	.04	.06	-.01	.00	(.94)				
10	Informational justice	4.17	0.96	-.03	-.02	-.02	.04	.11**	.14**	.01	.02	.72**	(.91)			
11	Performance difference	0.23	0.91	-.15**	.11**	-.14**	.19**	.01	-.03	.00	-.05	-.09*	-.06	(.64)		
12	Trust in team	4.07	0.90	.03	-.07	.07	.04	.03	.06	'09*	.10*	.35**	.42**	-.27**	(.91)	
13	Job satisfaction	4.06	0.94	.10*	-.11**	.13**	.12**	.07	.11**	.06	.11**	.27**	.38**	.-12**	.33**	('.75)

Note. N rages between 619 and 726, alphas are on the diagonal.
* p < .05 level. ** p < .01 level

TABLE 3: Results of the Confirmatory Factors Analysis and Model Fit

Model	x2	df	Difference	x2/df	TLI	RMSEA	CFI
4-Factor Modified Measurement Model	172.69**	97	-	1.78	0.98	0.03	0.99
5-Factor Model	535.52**	160	362.84**	3.347	0.95	0.06	0.96
4-Factor Model	1298.54**	164	1125.85**	7.918	0.84	0.10	0.88
1 -Factor Model	2618.64**	104	2445.96**	25.18	0.42	0.18	0.56
Independence Model	5831.74**	136	5659.06**	42.88	-	0.24	-
Hypothesized Structural Model	177.33**	98	-	1.81	0.98	0.03	0.99

Note. TLI, Tucker–Lewis Index (Tucker & Lewis, 1973); RMSEA, root-mean-square error of approximation (Steiger, 1990); CFI, comparative fit index. The one-factor model includes all variables. The four-factor model consists of performance difference, trust in team, job satisfaction and a global scale for interactional justice. The five-factor model treats interpersonal and informational justice as separate factors. The modified four-factor model includes only informational justice and correlates two error terms with each other. The difference in chi2 was calculated by independently contrasting each of the earlier models against the modifed four-factor measurement model.
** p < . 01

TABLE 4: Mediation Analysis

	Trust in Team		Job Satisfaction		
	Stand. B		*Stand. B*		
Step1					
Age	-.14	-.18	-.07	-.11	-.09
Education	-.05	-.05	-.07	-.07	-.06
Organisational tenure	.16	.15	.16	.17	.15
Job complexity	.02	.07	.09 *	.11 **	.09 *
Length of relationship with supervisor	-.09	-.05	-.04	-.03	-.02
Tenure with supervisor	.02	.00	.03	.02	.02
Length of relationship with team members	.05	.06	-.08	-.07	-.09
Tenure with team members	.03	.02	.09	.09	.08
Informational Justice	.41 **	.39 **	.37 **	.36 **	.29 **
Step 2					
Performance difference		-.25 **		-.11 **	-.06
Step 3					
Trust in team					.19 **
R²	*18.1%*	*24.0%*	*17.2%*	*18.2%*	*20.9%*
Change in R²		*5.9%* **		*1.0%* **	*2.7%* **
F	*13.98* ***	*17.92* **	*13.09* ***	*12.61* ***	*13.61* **
Df	*9,570*	*1,569*	*9,568*	*1,567*	*1,566*

Note. * $p < .05$. ** $p < .01$.

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