

The Links Between Group Development and Health in Manufacturing Industry

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Abstract

This study focuses on the relation between levels of group development and three health-related aspects of working life: work satisfaction, emotional exhaustion, and sick leave. This article presents a study with 30 groups in a manufacturing company. Data were collected from 274 group members of the 30 groups, using Group Development Questionnaire, self-reported measures of work satisfaction and emotional exhaustion, as well as company data on occurrence of sick leave occasions. The results indicate a strong relationship between levels of group development and work satisfaction, a moderately strong relation with emotional exhaustion, and a weaker or less clear relation with sick leave. Practical implications are discussed and future research suggested.

Keywords

group development, work satisfaction, emotional exhaustion, sick leave, manufacturing industry

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The utility of groups that cooperate well has mostly been studied with regard to what they accomplish, and there is substantial support for the link between ways of cooperation and task-related results (e.g., Naumann & Bennett, 2002; Wallace & Gilad, 2006; Wheelan & Kesselring, 2005). The link between ways of cooperation and team members' health is however a neglected area in research, the main focus has been on task performance outcome. Health-related aspects of working life has, however, mostly been studied on an individual level, both with regard to cross-sectional and intervention studies (Giga, Cooper, & Faragher, 2003). However, researchers have also given convincing arguments for the necessity to have an organizational or group level perspective to make effective interventions and improve health (Cooper & Cartwright, 1997). The links between teamwork and health are therefore of great interest to explore further.

The purpose of this study is to investigate the relationship between teamwork and health-related aspects of working life among blue-collar workers on an assembly line in a Swedish manufacturing industry.

Group Development

Group development, as a concept describing dynamic patterns of interaction over time in small groups, is well established in the literature. In the 1950s, Bales (Bales, 1950; Bales & Strodtbeck, 1951) studied phase patterns in problem-solving groups and suggested the equilibrium model that described the generic challenge groups have to find a balance between task-oriented and socio-emotional needs. Bennis and Shepard (1956) suggested their sequential theory of group development with two major phases: dependence-power relations and interdependence-personal relations, each containing three subphases. Several more or less related models have, at a later date, been suggested by small group researchers (Bion, 1961; Schutz, 1958; Tuckman, 1965). In the 1970s, Tuckman (Tuckman & Jensen, 1977) presented his often cited five-stage model comprising of forming, storming, norming, performing, and adjourning. A more recent group development model is the punctuated equilibrium model (Gersick, 1988), focusing on dynamics in project groups across time toward deadline. The model describes two phases with a transitional midpoint between them. McGrath (1991) contributed to a new way of thinking about group development with time, interaction, and performance (TIP) theory in the 1990s. TIP emphasizes the temporal patterning of interaction and performance in natural groups and states that groups might follow different developmental paths to reach the same outcome. All groups begin with goal choice and end with goal attainment, but differ in ways of activity in between.

This study is based on the Integrated Model of Group Development (IMGD) and the accompanying instrument Group Development Questionnaire (GDQ; Wheelan, 2005). Based on the skeleton of Tuckman's sequential model (Tuckman & Jensen, 1977), the integrated model is an attempt to integrate earlier theory and research, both sequential and non-sequential (e.g., Bales, 1965; Bennis & Shepard, 1956; Bion, 1961; Schutz, 1958; Tuckman & Jensen, 1977). Tuckman's model for group development has been criticized by McGrath and colleagues (McGrath, Arrow, & Berdahl, 2000) for being too simple. Above all, the model does not involve contextual factors and the research behind the model is not based on what happens in real-life groups over time. However, IMGD was developed by studying real-life groups (Wheelan & Hochberger, 1996; Wheelan & Williams, 2003).

The validity of the IMGD and GDQ has been established in a number of studies (e.g., Verdi & Wheelan, 1992; Wheelan, Davidson, & Tilin, 2003; Wheelan & Hochberger, 1996; Wheelan & Krasick, 1993; Wheelan & Mckeage, 1993). IMGD has also been compared with the punctuated equilibrium model in an observational study of simulated project teams over time (Chang, Bordia, & Duck, 2003). The researchers concluded that both IMGD and punctuated equilibrium models describe valid developmental patterns of project teams, and that the two models complement each other as they focus on different aspects of group functioning. The stages in IMGD are (a) dependency and inclusion, (b) counterdependency and fight, (c) trust and structure, and (d) work and productivity.

The first stage is characterized by team member dependency on the leader, safety concerns, and inclusion issues. Team members having opposing perspectives, counterdependency toward the leader, and tensions in the team distinguish the second stage. The third stage is marked by increased trust and focus on structure and strategies for goal achievement in the team. Finally, the fourth stage is characterized by the intense focus of team members on achieving the goal(s). Stage 4 groups have also established a team climate of openness and cohesion that facilitates effective work. Stage 1 groups spend about 40% working effectively and Stage 4 groups about 80%. The remaining time is used for maintenance, and dealing with interpersonal issues that arise and the like (Wheelan & Williams, 2003). As group cooperation develops, teams become more mature according to IMGD. Hence, Stage 3 and 4 groups are more developed or more mature groups than Stage 1 and 2.

Health-Related Aspects of Work

In this study, we have chosen to investigate three health-related aspects that are linked to work conditions: work satisfaction; emotional exhaustion, and

sick leave. We use the concept of health in a broad sense, with the note that work satisfaction is not generally regarded as health but rather correlated to it (Faragher, Cass, & Cooper, 2005). Our basic assumption is that the work group, and how its members cooperate, is an important work condition for individual members. As mentioned earlier, the link between teamwork and health is a neglected one in research. To our knowledge, the only research on team climate and health is using Team Climate Inventory (TCI; Anderson & West, 1996) and was carried out by Kivimäki and colleagues. Their studies have shown that poor team climate is associated with depressive disorders in a nationally representative sample (Sinokki et al., 2009) and absence due to sickness of hospital physicians (Kivimäki et al., 2001). TCI focuses on innovativeness in teams. The model describes *support for innovation* as one of four factors; the other three factors, *vision*, *participatory safety*, and *task orientation*, have a great overlap with characteristics of effective teamwork in general. In that sense, TCI has also an overlap with Stage 4, or effective teamwork, in IMGD. Thus, links between teamwork and health found by means of TCI could theoretically be replicated by means of GDQ.

Work satisfaction is an aspect of employee well-being (T. A. Wright & Cropanzano, 2000) and is, when measured as overall satisfaction, general satisfaction with an individual's job, and job situation. Work satisfaction and work conditions have been extensively researched (e.g., Higgins, 2000; O'Driscoll & Beehr, 2000). Some of these conditions that correlate with work satisfaction are constructs that are characteristics of more or less developed groups. For instance, Roberson (1990) found a relation between goal clarity, which is an aspect of effective teamwork, and work satisfaction. Parker et al. (2003) found in their meta-analytic review a positive correlation of .48 between a general appreciation of an individual's work group and work satisfaction. The link between team climate, as an aggregated concept like it is used in TCI, and work satisfaction has also been shown in earlier research (e.g., Gil, Alcover, & Peiró, 2005; Proudfoot et al., 2007). On the basis of this literature, we formulated the first hypothesis.

Hypothesis 1: Group maturity and work satisfaction are positively correlated. The more mature group work, the more group members are satisfied with their work in general.

Emotional exhaustion, the key component of burnout, was for a long time used as a concept specific to the human services. However, highly similar patterns with regard to antecedents to exhaustion have been demonstrated

when comparing trades such as human service, industry, and transport (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). In a longitudinal study of predictors of burnout among human service workers, Burke and Greenglass (1995) found that both the role stressors of conflict and ambiguity, and lack of social support were predictors of emotional exhaustion. Similar results were found in a study on manufacturing and service companies (Hsieh & Hsieh, 2003). Mature groups are characterized by the opposite; they are unambiguous and supportive.

Another set of work conditions connected to both effective teamwork and burnout is information and control. A lack of feedback is consistently related to burnout according to Maslach, Schaufeli, and Leiter (2001). High participation in decision making is another key feature of mature groups. Likewise, low degree of participation is associated with burnout (Maslach et al., 2001). Hence, we formulated the second hypothesis.

Hypothesis 2: Group maturity and emotional exhaustion is negatively correlated. The more mature group work, the less signs of emotional exhaustion among group members.

Sick leave has a relation to the other two aspects of health: a negative correlation with job satisfaction (Lambert, Edwards, Camp, & Saylor, 2005) and a positive correlation with emotional exhaustion (D. Wright, Beard, & Edington, 2002). Beemsterboer, Stewart, Groothoff, and Nijhuis (2009) concluded, when reviewing sick leave determinants, that the determinants that play an important role with regard to increased sick leave are generally the same that are important for decreased personal well-being. An example of determinants found in the review that relate to effective teamwork was good atmosphere at the workplace. Furthermore, Väänänen et al. (2003) studied psychosocial antecedents of absence due to sickness in the private industrial sector and found that lack of coworkers' support increased the frequency of sick leave. Team climate as an aggregated concept, and measured by TCI, correlate with sick leave. Kivimäki and colleagues (2001) found in a study of hospital physicians that poor teamwork seems to contribute to the absence due to sickness even more than traditional psychosocial risks, such as overload and low job control. Based on this rationale, we formulated the third and final hypothesis:

Hypothesis 3: Group maturity and sick leave is negatively correlated. The more mature group work, the less sick leave rates among group members.

Method

Participants and Procedure

This study was carried out in the Swedish automotive industry. The production context is lean, where employees work together in teams at a final assembly plant. The work itself is monotonous with little room for variation. Data for the 30 teams were collected in autumn 2011. Five of the groups were production leading teams (PLT) containing of 25 team leaders (blue-collar workers) and 5 production leaders (supervisors; white-collar workers). Each PLT was led by a production leader. Twenty-five of the groups were production teams (PT) consisting of 244 blue-collar workers. Each PT was led by a team leader. Due to the small number of groups, the results for PT and PLT were combined. No analysis was done to detect if there were any differences between PLT and PT. GDQ instruments were distributed to the 274 participants; 100% response was achieved.

The number of members in the groups varied from 4 to 14 ($M = 9.1$) members. The number of female members in the groups varied from 0 to 7 ($M = 2$). The groups had between 2 and 120 months working together ($M = 33.6$ months). Team age was calculated based on how long at least 50% of the members had worked together in the same group.

To gather data with the GDQ (Wheelan & Hochberger, 1996) and additional health-related questions, the researchers met the five production leaders and gave them written instructions on how to administer the GDQ. The respondents filled in the questionnaires anonymously during working hours and sent them to the researchers across a 14-day period.

Measures

GDQ (Wheelan & Hochberger, 1996) was used for assessing maturity of the groups. The 60-item GDQ contains four scales that correspond to the first four stages of group development according to IMGD. Each scale contains 15 items and each item has a Likert-type response scale from I (*never true of this group*) to V (*always true of this group*). Therefore, the minimum score on each scale is 15 and the maximum score is 75.

This study was conducted with the Swedish translation of GDQ, GDQ SE3, which is the third revised version. Cronbach's alphas for GDQ SE3 Scales I, II, III, and IV are .77, .90, .81, and .87, respectively, according to Jacobsson and Persson (2011). Norm data for GDQ SE3 are shown in Table 1. Norms are based on 357 groups that were representative for Swedish working life.

Table 1. Norms for GDQ SE3 Based on 357 Swedish Groups.

	Scale I	Scale II	Scale III	Scale IV
Maximum value	51.8	61.7	68.8	69.3
84th percentile	43.1	43.5	59.7	61.6
<i>M</i>	37.2	34.7	53.5	55.3
16th percentile	31.3	25.9	47.3	49.0
Minimum value	21.5	18.7	30.0	30.0
<i>SD</i>	5.7	8.6	6.1	6.2

Note. GDQ SE3 = Group Development Questionnaire Swedish version 3.

Source: Jacobsson and Persson (2011).

A group's overall stage is determined by considering the mean scores of the four scales for a specific group and comparing them with mean scores of normative data. During Stage 1 of group development, the mean score on GDQ Scale I is at its highest, and scores on the other three scales are relatively low. During Stage 2, the mean score of GDQ Scale II is at its highest, and scores on the other three scales remain relatively low. At Stage 3, mean scores on GDQ Scales III and IV begin to increase, and mean scores on GDQ Scales I and II remain relatively low. Finally, at Stage 4, mean scores on GDQ Scales III and IV continue to increase, whereas mean scores on GDQ Scales I and II remain relatively low (Wheelan et al., 2003). To summarize, groups with a low degree of development have high values on Scales I and II but low values on Scales III and IV. Groups with a high degree of development (i.e., being mature groups) have the opposite, low values on Scales I and II but high values on Scales III and IV.

Emotional exhaustion was measured with the personal burnout subscale of the Copenhagen Burnout Inventory (Kristensen, Borritz, Villadsen, & Christensen, 2005). However, after having a response-psychological test panel use the scale in an earlier study, it was reduced from six to five items (Jacobsson & Pousette, 2012). The excluded item was about feeling receptive to sickness and was difficult to answer. Of the remaining five items, example items are as follows: "How often do you feel tired?" and "How often are you emotionally exhausted?" Scale responses range from 1 (*never*) to 5 (*always*); Cronbach's alpha was .88 according to Jacobsson and Pousette (2012).

Work satisfaction or job satisfaction was measured with a three-item scale of overall job satisfaction (Wanous & Lawler, 1972). Sample items are "Based on an overall assessment, how satisfied are you with your current work situation?" and "How well does your company meet your expectations for how you want it in your work?" The scale responses range from 1 (*not*

at all) to 10 (to the highest degree). Cronbach's alpha was .91 according to Jacobsson and Pousette (2012).

Absence due to sickness was measured by using data from the company. This measurement is comparable with data used by Kivimäki et al. (2001) as it comprises reported sick leave to the employer; maternity leave is excluded. The data available on production group level were frequency of sick leave occasions. The frequency on group level varied from 1 to 20 occurrences ($M = 10$) during a 6-month period. Due to the variation in number of group members, the frequency of sick leave occasions divided by number of group members was chosen. During the 6 months that preceded team members reporting questionnaire data, the mean sick leave occasions per group member varied from 0.2 to 2.1 ($M = 1.1$).

Statistical Analysis

Pearson product-moment correlations were used to test the hypotheses. As the hypotheses were designed and motivated by earlier research, the direction of the correlation could only be in one direction. To avoid a Type II error due to a small sample size, one-tailed tests were used.

Results

Means (and standard deviations) for the 30 groups on GDQ scales was for GDQ Scale I, $M = 40.9$ ($SD = 3.5$); for Scale II, $M = 36.5$ ($SD = 7.6$); for Scale III, $M = 51.2$ ($SD = 5.5$); and for Scale IV, $M = 52.2$ ($SD = 6.0$). Means (and standard deviations) for emotional exhaustion was $M = 2.7$ ($SD = 0.3$), for work satisfaction $M = 5.9$ ($SD = 0.7$), and for sick leave mean occasions $M = 1.1$ ($SD = 0.6$).

GDQ Scales I and II were slightly above the mean compared with Swedish GDQ norms but not over the 84 percentile. The means of GDQ Scales III and IV were slightly below the Swedish GDQ norms but not below the 16 percentile. The mean values of the 30 groups in the present study compared with Swedish norms indicate that the studied groups were somewhat less developed as groups than the average Swedish group.

Mean values for emotional exhaustion and work satisfaction were at the same levels as available reference data on Swedish employees (Jacobsson & Pousette, 2012). Table 2 displays correlations between the GDQ scales and work satisfaction, emotional exhaustion, and sick leave occasions.

As expected, the results give support for Hypothesis 1 that more mature group work predicts higher levels of work satisfaction. All four correlations were significant and in the same direction as the hypothesis with effect sizes

Table 2. Correlations Between Group Development Questionnaire Scales I to IV and Work Satisfaction, Emotional Exhaustion, and Sick Leave Mean Occasions ($N = 30$ Groups).

	Scale I	Scale II	Scale III	Scale IV
Work satisfaction	-.33*	-.57**	.59**	.68**
Emotional exhaustion	.08	.28†	-.20	-.35*
Sick leave mean occasions	.20	.29†	-.22	-.26†

† $p = .10$ (one-tailed). * $p = .05$ (one-tailed). ** $p = .01$ (one-tailed).

that were medium strong to strong according to Cohen (1992). The results gave partial support to Hypothesis 2 that less signs of emotional exhaustion among group members should be shown when the group is more mature. There was a significant medium strong negative correlation with Scale IV in GDQ and one almost significant, $p = .07$, for the correlation with Scale II. All directions were in line with the hypothesis. Hypothesis 3, that more mature group work is correlated with less sick leaves among group members, did not get a clear support. However, the correlation with Scale II and Scale IV was almost significant, with p values less than .10 and all the directions were in line with the hypothesis.

Discussion

The study investigated the relationship between levels of group development and three health-related aspects of working life: work satisfaction, emotional exhaustion, and sick leave. The main result supports the hypotheses to a certain extent; although not all correlations were significant, they were all in the expected directions.

Hypothesis 1: Group Maturity and Work Satisfaction

There was, as expected, substantial support for our first hypothesis—that group maturity and work satisfaction are positively correlated. We found significant positive correlations between GDQ Scales III and IV, and work satisfaction. The effect size was strong according to Cohen (1992) with .59 on GDQ Scale III and .68 on GDQ Scale IV. Furthermore, there was a significant negative correlation between GDQ Scales I and II, and work satisfaction. For GDQ Scale I, the effect size of $-.33$ was medium strong and for the GDQ Scale II the effect size of $-.57$ was strong (Cohen, 1992).

Locke (1969) argued that job satisfaction is a pleasurable emotional state as a result of how the individual appraises the work as achieving one's job values. Task-related job values could be *task success and achievement* that is to reach or accomplish qualitative and quantitative goals. Task achievement is a major source of job satisfaction (Locke, 1970). Mature work groups in GDQ Stages III and IV have more group goals that are clear, shared, and agreed upon by the members than groups in GDQ Stages I and II. There is also greater role clarity among the group members and assignments match individual abilities better (Wheelan, 2005). Goal achievement is also one of the characteristics in Stage IV and groups in this stage are described as high performance units (Buzaglo & Wheelan, 1999). Hence, members in high performance work groups are more likely to view their work situation as good—a hypothesis that gained clear support in this study.

Hypothesis 2: Group Maturity and Emotional Exhaustion

Hypothesis 2, that group maturity and emotional exhaustion is negatively correlated, was partly confirmed. As expected, a significant negative correlation between GDQ Scale IV and emotional exhaustion was shown. The effect size of $-.35$ was medium strong according to Cohen (1992). There was also positive correlation between GDQ Scale II and emotional exhaustion, in line with what was expected; however, the p value was only $.07$. Furthermore, the correlations with GDQ Scales I and II were small and not significant; altogether, this suggests rather moderate support for the hypothesis.

A possible explanation to the rather moderate support for the relation between GDQ scales and emotional exhaustion could be the organizational setting and nature of tasks in this study. For instance, in a parallel study with the same instruments but in a completely different organizational setting, namely, public schools, the correlations between GDQ scales and emotional exhaustion were stronger. The strongest was the positive correlation between GDQ Scale II and emotional exhaustion (Svedlund, 2012). This implies that group maturity may have different effects in different work settings.

Hypothesis 3: Group Maturity and Sick Leave

There was no clear support for our third hypothesis that more mature groups have fewer sick leave occasions among group members than less developed groups. Sick leave patterns are explained partly by health-related and partly by work-related aspects (Roskes, Donders, & van der Gulden, 2005). Furthermore, Kivimäki et al. (2001) found a relation between team climate, as an aggregated construct, and absence due

to sickness when studying hospital physicians. They concluded that poor teamwork seemed to contribute to the sickness absenteeism of hospital physicians even more than traditional psychosocial risks, such as overload and low job control. The reason why the present study failed to show the expected relationship could be due to the small sample size.

Practical Implications

A practical implication of our study could be that team development intervention is a useful way to work with health promotion among blue-collar workers in manufacturing industries. When working with health promotion, it is important to recognize work groups as an important contextual phenomenon linked to individual's health. Employers, Human Resources (HR) managers, managers, and organizational consultants might therefore benefit from focusing on contextual factors in groups when working with health promotion. Increased development and maturity in blue-collar work teams is probably possible by interventions that increase shared goal clarity, create role clarity and role assignment based on abilities, develop communication structures that are open and match the demand of the task, and establish group norms that encourage high performance and quality (Buzaglo & Wheelan, 1999).

Limitations and Future Research

A possible reason for the rather small effect sizes with regard to sick leave is that we have few teams. Our study sample consists of only 30 teams, implying low statistical power. Future research would benefit from focusing on larger samples of teams. Furthermore, the study is cross-sectional, investigating correlations and offers little support for causal explanations. Possible topics of future research should be designing longitudinal studies that offer more of causal explanations of the links between group development and job satisfaction, exhaustion, and sick leave. For instance, is it possible to improve health by interventions that influence group development?

The total sick leave pattern at the studied company is measured by short-term and long-term sick leave. Short-term sick leave is defined as 1 to 14 days and long term is defined as 15 days and longer. In our study, we have only examined sick leave occasions per group member. This implies that two employees that have the same sickness frequency can have a different impact on the team if the duration is different. A worker who is away for 40 days on four different occasions probably has a more negative impact on the team compared with 4 days on four different occasions. Sick leave occasions were the

only sick leave data available on the team level. There were relatively small differences between the teams regarding sick leave occasions per group member. This could also be a possible reason for the rather small effect size with regard to sick leave. Future research would benefit from focusing on patterns of both sick leave duration and frequency. Earlier research has pointed out that uneven gender distribution could have impact on sick leave (Alexanderson, Leijon, Åkerlind, Rydh, & Bjurulf, 1994) especially regarding woman when they are a minority at the workplace. The present study has not controlled for gender composition in the sample; future research would benefit from doing this. Another limitation in the present study was the lack of reasons for sick leave, which is an inevitable consequence of using register data. Future research would benefit from focusing on both patterns of sick leave duration and the frequencies of these, as well as clarifying reasons for sick leave.

Finally, with regard to future research, there is an ongoing sister project focusing on the same questions as the project that the present study highlights. Contextual settings for the other project are quite different from this one; it investigates teams in the public school system. Interesting topics for future research would be to compare in which way group maturity correlates with health-related aspects in those different contextual settings.

Conclusion

This study focuses on group development and its relation to three health-related aspects: work satisfaction, emotional exhaustion, and sick leave. The total result implies that members of well-developed groups have higher levels of work satisfaction and to some extent lower levels of emotional exhaustion. Furthermore, the total result also indicates a possibility of lower rates of sick leave. Despite the limitations of our study due to the small sample size, this could imply that being a member of a group that is less developed is a risk factor to health and psychological well-being. Furthermore, being a member of a mature group might promote health and psychological well-being.

Declaration of Conflicting Interests

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