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### Self-Managing Teamwork and Psychological Well-Being:

#### **REVIEW OF A MULTILEVEL RESEARCH DOMAIN**

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In this article, we present a qualitative discussion of 28 empirical studies on self-managing teamwork and psychological well-being. We address three questions: (a) Which variables did they include and which results did they obtain?; (b) How did authors deal with issues of level of theory, measurement, and analysis?; and (c) Do such level issues affect the results of the studies? This review demonstrates that only job satisfaction is consistently related to self-managing teamwork. In addition, authors often fail to specify the level of their theory, thereby impeding judgment on the appropriateness of analysis procedures. Finally, we present preliminary evidence that level issues may affect the results. We plead for the incorporation of multilevel theory and analysis techniques into the field of self-managing teamwork and psychological well-being.

Keywords: multilevel theory; psychological well-being; review; self-managing teamwork

In the 1950s, researchers of the Tavistock Institute of Human Relations brought to light a new kind of work design. In the mines, the traditional small-scale work organization in close-knit groups had been replaced by the large-scale and depersonalized longwall method of coal getting (see Trist & Bamforth, 1951). Although studying the consequences of this longwall method, Tavistock researchers came across groups of workers that had taken the initiative to reorganize their work situation into one that strongly resembled the traditional small-scaled group work. Such groups showed increased

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productivity, greater personal satisfaction, and decreased absenteeism (Trist & Bamforth, 1951). These coal mine studies played a major role in the development of sociotechnical systems theory (SST). Application of SST has concentrated on group work design and gave rise to the concept of self-managing teamwork (Parker, Wall, & Cordery, 2001).

In organizations, self-managing teamwork seems to have become common practice, at least in industrialized societies. Although in 1987, 28% of Fortune 1000 firms indicated they employed self-managed work teams, this number increased to 68% in 1993 (Lawler, Mohrman, & Ledford, 1995). SST has generated a large number of research efforts. In this respect, the effect of self-managing teamwork on the psychological well-being of team members is a major theme. In the present study, we address three issues that are relevant to research within this theme and use these issues to structure a literature review.

The first issue concerns the focus of previous studies. Which variables did they include and which results did they obtain? This is a highly relevant issue, because these results are not entirely ambiguous. The second issue addresses a topic that is receiving more and more attention in organizational psychology: the multilevel character of this research field. Among other things, this topic concerns the choice of levels of theory, measurement, and analysis, and the consistency between those levels (Klein, Dansereau, & Hall, 1994; Yammarino, Dionne, & Uk Chun, 2002). We argue that such multilevel issues are important to the field of self-managing teams and wellbeing. Again, we review previous empirical studies, but this time the focus is on these multilevel issues. Do authors address multilevel issues? If they do, how do they deal with them? The answers to these questions may have implications for the validity of the results of the studies, as discussed in our first issue. Therefore, in the third and final issue, the first two issues converge. We examine whether the way in which level issues are addressed affects the results of studies about self-managing teamwork and psychological wellbeing. We conclude with a discussion of the results of our review and the proposition of a number of themes that, in our opinion, deserve attention in future research in the field.

#### EFFECTS OF SELF-MANAGING TEAMWORK ON PSYCHOLOGICAL WELL-BEING

Several theoretical perspectives may be relevant to the study of self-managing teamwork and psychological well-being. These perspectives include group task design, group composition theory, group interaction process, and group development (Campion, Medsker, & Higgs, 1993; Sonnentag, 1996). Of these perspectives, the task design approach has been most influential, because it is most specific to the study of self-managing teamwork, whereas the other perspectives are equally applicable to the study of other kinds of group work.

The task design approach to self-managing teamwork and psychological well-being is anchored in Hackman and Oldham's (1975) job characteristics model (JCM) (e.g., Campion, Papper, & Medsker, 1996; Cummings, 1978; Spreitzer, Cohen, & Ledford, 1999; Wall & Clegg, 1981). The JCM identifies five core job dimensions: autonomy, task variety, task identity, task significance, and feedback. These dimensions are supposed to promote work motivation and job satisfaction and reduce absenteeism and turnover (Hackman & Oldham, 1975). The JCM is consistent with the insights provided by sociotechnical systems theory insofar as—when implemented effectively—the task of a self-managing team will contain high levels of exactly the five JCM core dimensions (Hackman, 1987). This consistency has inspired many researchers to the assumption that, in line with the JCM, implementing self-managing teamwork will increase team member psychological well-being. This assumption is central to the majority of studies on self-managing teamwork and psychological well-being.

According to Diener (cited in Sonnentag, 1996) well-being "refers to a person's subjective positive experience of life and is closely related to happiness, satisfaction, morale, and positive affect" (p. 346). In our review of the literature, we adopt this broad perspective and include all studies that meet Diener's definition.

The first issue for our literature review concerns the focus of previous studies on self-managing teamwork on psychological well-being:

*Issue 1:* Which variables were included in previous studies, and which are the results they obtained?

#### SPECIFYING LEVELS OF THEORY, MEASUREMENT, AND ANALYSIS

The traditional division of the organization into different levels, which are studied as isolated domains, is starting to lose ground to more integrated approaches (Klein & Kozlowski, 2000). Organizations are multilevel systems, making level issues typical of organizational theory and research. Every construct is tied to one or more organizational levels. Examples of such levels include the individual employee, work groups, organizations, or

industries. When developing constructs or theories, researchers generally aim at a specific organizational level. Subsequently, we refer to this as the "level of theory." This is the level to which generalizations are made. The level of theory is distinct from the levels of measurement and statistical analysis. The level of measurement describes the actual level from which data are collected, whereas the level of analysis describes the treatment of the data during statistical procedures (Klein et al., 1994).

It is crucial that levels of measurement and analysis are in accordance with the level of theory. If this is not the case, researchers risk making misplaced generalizations or, in the language of levels, committing a fallacy of the wrong level (Klein et al., 1994; Snijders & Bosker, 1999). A common example is the ecological fallacy (Robinson, 1950; Snijders & Bosker, 1999), which occurs when higher level correlations are used to make lower level inferences. Another potential fallacy is the neglect of the original data structure. To illustrate this fallacy, let us suppose that we are interested in the relationship between work autonomy (X) and absenteeism (Y), and that Figure 1 represents the situation for six teams. In Figure 1, a different character represents each team. Figure 1a depicts the individual scores, while figure 1b depicts the average team scores.

When examining Figure 1a, we conclude that autonomy and absenteeism are positively related. However, if we examine Figure 1b we conclude the exact opposite. If we have not specified the level of our theory, these contradictory results cannot be interpreted. Moreover, if we have specified a theoretical level but perform data analysis at a level that is inconsistent with this theoretical level, our conclusions will be erroneous and seriously misleading.

This example represents an extreme situation where inconsistency between data at the team and the individual level is maximized. Even though this inconsistency will generally be less pronounced, our example clearly demonstrates the possible consequences of lack of attention for issues of level of theory, measurement, and analysis.

#### LEVEL ISSUES IN THE DOMAIN OF SELF-MANAGING TEAMWORK AND WELL-BEING

The similarity between features of task design for self-managing teams and the JCM task characteristics has led many authors to conclude that the JCM is applicable to self-managing teamwork. However, it is important to note that to apply the JCM to self-managing teamwork means to switch from one level of theory to another. Although the JCM is specified at the level of the individual employee, stating that certain features of the individual task result in increased individual motivation (Hackman & Oldham, 1975; Sonnentag, 1996), sociotechnical systems theory clearly refers to the level of

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Figure 1: Individual- and Team-Level Data Structure NOTE: Adapted from Snijders and Bosker (1999, p. 14, Fig. 3.1).

the work team (Kuipers & Van Amelsfoort, 1994; Parker et al., 2001; Pearson, 1992).

Because both the level of the individual employee and the level of the work team are central to the domain of self-managing teamwork and psychological well-being, this domain is sensitive to level issues and susceptible to level fallacies. Therefore, it is important for authors to be specific about the levels of theory, measurement, and analysis they assume. Questions that should be addressed include:

- Why apply a construct to a different level of theory?
- Is the meaning of the construct different from its counterpart at the original level, and if so, in what respect?
- What about its relationships to other constructs?

Once a specific level of theory is adopted, measurement and analysis procedures should be chosen accordingly to avoid committing a fallacy of the wrong level (Klein et al., 1994; Snijders & Bosker, 1999).

Our perspective on level issues in the domain of self-managing teamwork and psychological well-being closely corresponds to that of Yammarino et al. (2002) in their review of transformational and charismatic leadership. They distinguish between the level of theory, measurement, analysis, and inference drawing. In our review, issues with regard to the level of inference drawing are integrated with our discussion of the level of theory and are, as such, not discussed separately.

The choice of levels of theory, measurement, and analysis has important consequences for the further design of a study, for generalizability of findings, and possibly also for the kind of results that are obtained. Therefore, this choice of levels is the second issue that we address in our literature review.

*Issue 2:* Which levels of theory, measurement, and analysis do researchers in the domain of self-managing teamwork and psychological well-being adopt?

#### DOES THE CHOSEN LEVEL AFFECT THE OBTAINED OUTCOMES?

It is common for the results of studies at the individual level to differ substantially from those of studies at the group level (Klein et al., 1994; Ostroff, 1993). As such, the level of theory that is specified may have far-reaching implications for the outcomes of a study, and lack of consistency between levels of theory, measurement, and analysis may lead to serious misinterpretation of results. This line of reasoning evokes an interesting question: In studies in the domain of self-managing teamwork and psychological wellbeing, do level issues influence the outcomes that are obtained? At this point, the first two central issues converge. These issues address the actual outcomes and the way in which level issues are incorporated in the studies in our review. However, how are these issues related? Does it really matter if and how level issues are addressed? This brings us to the third and final central issue for our literature review:

*Issue 3:* Do the adopted levels of theory, measurement, or analysis have consequences for the outcomes of studies about self-managing teamwork and wellbeing?

# SELF-MANAGING TEAMWORK AND PSYCHOLOGICAL WELL-BEING: A REVIEW

We now turn to our review of the literature. Self-managing teams are also referred to as self-directed, self-organizing, self-regulating, empowered, autonomous, and semiautonomous. Several authors have proposed a framework to organize this terminology (e.g., Banker, Field, Schroeder, & Sinha, 1996; Hackman, 1987); however, a closer look at the literature teaches us that these frameworks are not widely adopted. Rather, terms seem to be used interchangeably. Despite this lack of consistency in terminology, authors do seem to agree on what such a team would typically look like. The typical selfmanaging team would have less than 20 members who are jointly responsible for a well-defined and meaningful piece of work. Members perform a variety of tasks within the team, and the team has considerable authority with regard to, for example, work methods, planning, and coordination with other teams (e.g., Cohen & Bailey, 1997; Cummings, 1978; Goodman, Devadas, & Hughson, 1988; Kemp, Wall, Clegg, & Cordery, 1983; Pearson, 1992).

To locate the relevant literature, we searched relevant databases, using the terms *self-managing*, *self-directed*, *self-organizing*, *self-regulating*, *empowered*, *autonomous*, and *semiautonomous* in combination with *group*, *work group*, *team*, and *work team*. We screened reference lists and added relevant references to our collection. To ensure that findings are not outdated and apply to current self-managing teams, we included only empirical studies that were published after 1980. In addition, we included only those studies that incorporated a measure of psychological well-being. These criteria resulted in a final selection of 28 studies (see Tables 1 and 2).

To facilitate our discussion of the studies, we distinguish between (a) quasi-experimental and (b) pure correlational studies. Quasi-experimental studies compare a condition "with" self-managing teams to one "without" on specific aspects. In the ideal case, a study would have a Solomon four-group design (pretest, posttest, random allocation to groups, and control groups) (Campbell & Stanley, 1963); however, studies that compare a situation before the introduction of teamwork to the situation after self-managing teams have been installed (longitudinal studies) are also included in this category. Correlational studies identify a number of variables that are characteristic of self-managing teamwork and relate those variables to expected outcomes. This category includes longitudinal and cross-sectional studies, studies that rely solely on self-report data, and studies that include more objective measures. Because the two categories differ in the type of results and in the way results are presented, we discuss them separately.

#### ISSUE 1: VARIABLES AND RESULTS OF PREVIOUS STUDIES ON SELF-MANAGING TEAMWORK AND PSYCHOLOGICAL WELL-BEING

*Quasi-experimental studies.* We found 18 quasi-experimental studies that addressed the relationship between self-managing teamwork and psychological well-being (Table 1). These studies either compared self-managing teamwork to more traditional work, compared work groups prior to the implementation of self-managing teams to groups after this implementation, or both.

_			Out	comes	
Stu	udy	Satisfaction	Motivation	Commitment	Absenteeism
1	Antoni, 1997	n/a	n/a	n/a	n/a
2	Batt & Appelbaum, 1995	+	n/a	+	n/a
3	Boonstra, 1998	0	0	n/a	n/a
4	Cohen & Ledford, 1994	+	n/a	0	0
5	Cohen, Chang, & Ledford, 1997	0	n/a	+	n/a
6	Cordery, Mueller, & Smith, 1991	+	n/a	+	_
7	Elmuti & Kathawala, 1997	n/a	n/a	n/a	n/a
8	Hayslip, Miller, Beyerlein,				
	Johnson, Metheny, & Yeatts, 1990	6 n/a	n/a	n/a	n/a
9	Kemp, Wall, Clegg, & Cordery,				
	1983	+	0	0	n/a
10	Lemke & Knauth, 1997	0	0	n/a	0
11	Melin, Lundberg, Soderlund, &				
	Granqvist, 1999	n/a	n/a	n/a	n/a
12	Mueller & Cordery, 1992	_	n/a	-	n/a
13	Pearson, 1992	+	+	n/a	+
14	Rao, Thornberry, & Weintraub,				
	1987	n/a	n/a	n/a	n/a
15	Seers, Petty, & Cashman, 1995	+	n/a	n/a	+
16	Wall & Clegg, 1981	+	+	n/a	n/a
17	Wall, Kemp, Jackson, & Clegg,				
	1986	+	0	0	n/a
18	Weisman, Gordon, Cassard,				
	Bergner, & Wong, 1993	+	n/a	n/a	n/a

 TABLE 1

 Characteristics and Outcomes of

 Quasi-Experimental Studies in Our Review Sample

NOTE: + = positive effect; 0 = no effect; - = negative effect; n/a = not applicable.

The variety of outcome variables that have been studied is striking. The 18 studies included approximately 60 different outcome variables. This apparent lack of an accepted model on relevant variables is rather problematic for the researcher trying to summarize results. We therefore confine our review to outcome variables that were included in at least five of the 18 studies.

Four dependent variables relating to psychological well-being were included in at least five studies. These were job satisfaction (13 studies), organizational commitment (7 studies), work motivation (6 studies), and absenteeism (5 studies). It is surprising that work motivation was not studied more often, because it is central to the JCM that constituted the major theoretical foundation for studies of self-managing teamwork and psychological well-being.

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The results for job satisfaction were most consistent. Of the 13 studies that included job satisfaction, 9 reported elevated levels of job satisfaction in a self-managing team context as compared to a more traditional work environment (Batt & Applebaum, 1995; Cohen & Ledford, 1994; Cordery, Mueller, & Smith, 1991; Kemp et al., 1983; Pearson, 1992; Seers, Petty, & Cashman, 1995; Wall & Clegg, 1981; Wall, Kemp, Jackson, & Clegg, 1986; Weisman, Gordon, Cassard, Bergner, & Wong, 1993). Three studies found no effect (Boonstra, 1998; Cohen, Chang, & Ledford, 1997; Lemke & Knauth, 1997), whereas one found a negative effect that was ascribed to the only partial implementation of the self-managing team concept (Mueller & Cordery, 1992). The results for the remaining outcomes were less consistent. With respect to organizational commitment, three studies reported positive effects of self-managing teamwork (Batt & Appelbaum, 1995; Cohen et al., 1997; Cordery et al., 1991), three reported no effect (Cohen & Ledford, 1994; Kemp et al., 1983; Wall et al., 1986) and one study reported a negative effect (Mueller & Cordery, 1992). With respect to work motivation, two studies reported a positive effect (Pearson, 1992; Wall & Clegg, 1981), whereas the remaining four studies found no effect (Boonstra, 1998; Kemp et al., 1983; Lemke & Knauth, 1997; Wall et al., 1986). Finally, with respect to absenteeism, two studies reported a positive effect of self-managing teamwork in the sense that absenteeism was lower in a self-managing team context compared to a more traditional work environment (Pearson, 1992; Seers et al., 1995). Two studies found no effect (Cohen & Ledford, 1994; Lemke & Knauth, 1997), and one reported a negative effect (Cordery et al., 1991).

Summarizing, we conclude that job satisfaction is the only variable that seems to be consistently related to the implementation of self-managing teamwork. All other possible outcome variables have either not been studied often enough, or results were too inconsistent to allow generalization.

*Correlational studies.* Our sample included 10 correlational studies. These studies related characteristics of a self-managing team to certain outcomes. Most studies were cross-sectional, and if control groups were used, they were used to compare the relationship between predictors and outcome variables in a self-managing team context to that in a more traditional work environment, not to compare outcomes.

Discussing the outcomes of these correlational studies is somewhat more problematic than discussing those of the quasi-experimental studies. The variety in outcome variables was even larger, and in addition, an equally large variety of predictor variables were included that were all assumed to affect these outcome variables. We therefore concentrate on the effects of characteristics that are central to self-managing teamwork as opposed to

TABLE 2 Core Job Dimensions in Correlational Studies in Our Review Sample

				Core Dime	ensions		
	-	Autonomy	Variety	Significance	Identity	Feedback	Composite
19	Alper, Tjosvold, &						
	Law, 1998						
20	Campion, Medsker, &						
	Higgs, 1993	х	х	х	х	х	х
21	Campion, Papper, &						
	Medsker, 1996	Х	х	х		х	х
22	Cohen, Ledford, &						
	Spreitzer, 1996						х
23	Janz, 1999	Х					
24	Janz, Colquitt, &						
	Noe, 1997	х					
25	Langfred, 2000	х					
26	Spreitzer, Cohen, &						
	Ledford, 1999	х	х	х	х	Х	х
27	Van Mierlo, Rutte,						
	Kompier, & Seinen, 200	1 x	х				
28	Ward, 1997						

NOTE: x = core job dimension is included in the study.

other kinds of teamwork. These are the five JCM core dimensions: autonomy, task variety, task significance, task identity, and feedback. Table 2 provides an overview of the core dimensions that were included in each correlational study. In addition, several studies examined a composite measure of task design, including all five JCM task characteristics. Some caution is due when comparing the studies in Table 2, because different instruments were used to measure the JCM task characteristics. The outcome variables that were included in the correlational studies were too diverse to display in Table 2. They are, however, discussed in the text.

Eight studies included measures of at least one JCM core dimension (Campion et al., 1993; Campion et al., 1996; Cohen, Ledford, & Spreitzer, 1996; Janz, 1999; Janz, Colquitt, & Noe, 1997; Langfred, 2000; Spreitzer, Cohen, & Ledford, 1999; van Mierlo, Rutte, Kompier, & Seinen, 2001), thus confirming our assumption that the JCM is an important theoretical foundation of studies of self-managing teamwork and well-being. Autonomy was included in all studies. Generally, autonomy was related to positive outcomes. Autonomy was associated with improved quality of work life (QWL) (Cohen et al., 1996; Spreitzer et al., 1999), increased work motivation (Janz, 1999; Janz et al., 1997), increased job satisfaction (Janz, 1999), reduced psychological fatigue (van Mierlo et al., 2001), and reduced absenteeism (Cohen et al., 1996). With regard to these positive relationships between autonomy and well-being, job satisfaction is an exception. Of the three studies that assessed the relationship between task autonomy and job satisfaction (Campion et al., 1993; Campion et al., 1996; Janz, 1999), only one reported evidence for this relationship (Janz, 1999). This observation is remarkable, because in the quasi-experimental studies, job satisfaction was the only variable that was consistently found to be related to the implementation of self-managing teamwork.

Task variety was included in five studies (Campion et al., 1993; Campion et al., 1996; Cohen et al., 1996; Spreitzer et al., 1999; van Mierlo et al., 2001) and was consistently associated with positive outcomes, such as QWL (Cohen et al., 1996), motivation to learn new skills and behavior (van Mierlo et al., 2001), reduced psychological fatigue (van Mierlo et al., 2001), and job satisfaction (Campion et al., 1993; Campion et al., 1996).

The remaining core dimensions were studied less often. Task significance was included in three studies (Campion et al., 1993; Campion et al., 1996; Spreitzer et al., 1999), and was also found to be positively related to QWL (Spreitzer et al., 1999), whereas contradictory results were reported for job satisfaction (Campion et al., 1993; Campion et al., 1996). Task identity was included in two studies (Campion et al., 1993; Spreitzer et al., 1999) and was found to be positively related to QWL (Spreitzer et al., 1999), but not to job satisfaction (Campion et al., 1993). Feedback was included only once, and was found to be modestly related to QWL (Spreitzer et al., 1999). In addition, four studies examined a composite measure of task design, including all five JCM dimensions (Campion et al., 1993; Campion et al., 1996; Cohen et al., 1996; Spreitzer et al., 1999). This composite measure was associated with higher job satisfaction (Campion et al., 1993; Campion et al., 1996) and QWL (Spreitzer et al., 1999). Another study failed to find a relationship between the composite measure of task design and QWL (Cohen et al., 1996). Finally, two studies that examined the relationship between task design and absenteeism failed to find evidence for this relationship (Cohen et al., 1996; Spreitzer et al., 1999).

In general, the five core job dimensions appear to be positively related to various indicators of psychological well-being. The emphasis on autonomy and variety as dimensions of task design is consistent with an observation of Cordery (1996), who argued that these are the two most important criteria for designing self-managing teams.

#### ISSUE 2: LEVELS OF THEORY, MEASUREMENT, AND ANALYSIS

*Quasi-experimental studies*. Table 3 lists all studies in our sample and their respective levels of theory, measurement, and analysis.

Our inventory of the level of theory that was assumed in the 18 quasiexperimental studies indicates that few authors specified the level of theory. No more than six studies were unambiguous about the theoretical level of interest (Batt & Appelbaum, 1995; Boonstra, 1998; Pearson, 1992; Seers et al., 1995; Wall & Clegg, 1981; Wall et al., 1986). With one exception (Batt & Appelbaum, 1995), these studies indicated the work team as the level to which generalization is appropriate. This is in accordance with sociotechnical systems theory that identifies the self-managing team as the smallest organizational unit that can function as an undivided whole (Parker et al., 2001). Seers et al. (1995) are the only authors in our sample who recognized that the meaning of a construct may be different at different theoretical levels. Wall and Clegg (1981) on the other hand, cited Hackman (1977), stating that dimensions like task autonomy and task identity "could be applied to the analysis of group tasks as readily as they are to individual tasks" (p. 34). Moreover, they assumed that the effects of those dimensions would be the same, irrespective of the level they refer to. As such, they expected team tasks that incorporate the five core job dimensions from the JCM to result in an increase in the motivation of individual team members. The authors seemed to ignore that what they were presenting is, in fact, an example of a cross-level interaction, where group-level characteristics (group task dimensions) are expected to affect individual-level outcomes (motivation), and they provide no description of how and why characteristics at the group level may affect individual outcomes.

Summarizing, we conclude that authors in the quasi-experimental category rarely discussed issues concerning the level of theory, and if they did they generally failed to recognize or discuss possible implications of their choice.

With respect to the level of measurement, all quasi-experimental studies collected data from individual employees. When collecting individual survey data, items might refer to the level of the individual or to the level of the work team (item referent in Table 3). In five studies, individual employees were asked to complete a questionnaire with all items referring to their own, individual situation (Cohen & Ledford, 1994; Cordery et al., 1991; Pearson, 1992; Rao, Thornberry, & Weintraub, 1987; Weisman et al., 1993). In three studies, the items measuring task characteristics referred to the situation of the work team, such that individuals were asked to judge their team (Kemp

	Level of Theory	Level of Measurement	Item Referent	Level of Analysis
Quasi-Experimental Studies				
1 Antoni, 1997	ż	individual	ż	Experimental vs. Control group
2 Batt & Appelbaum, 1995	individual	individual	ż	Experimental vs. Control group
3 Boonstra, 1998	team	individual	varying	Experimental vs. Control group
4 Cohen & Ledford, 1994	ż	individual	individual	team
5 Cohen, Chang, & Ledford, 1997	ż	individual	ż	team
6 Cordery, Mueller, & Smith, 1991	ż	individual	individual	Experimental vs. Control group
7 Elmuti & Kathawala, 1997	ż	individual	varying	Pre-vs. posttest
8 Hayslip, Miller, Beyerlein, Johnson, Metheny, & Yeatts, 1996	ż	individual	ż	Experimental vs. Control group
9 Kemp, Wall, Clegg, & Cordery, 1983	ż	individual	team for task design <sup>a</sup>	Experimental vs. Control group
10 Lemke & Knauth, 1997	ż	individual	ż	Experimental vs. Control group
11 Melin, Lundberg, Soderlund, & Granqvist, 1999	ż	individual	ż	Experimental vs. Control group
12 Mueller & Cordery, 1992	ż	individual	ż	Pre-vs. posttest
13 Pearson, 1992	team	individual	individual	Experimental vs. Control group Pre- vs. posttest
14 Rao, Thornberry, & Weintraub, 1987	ż	individual	individual	High vs. Low performing teams
15 Seers, Petty, & Cashman, 1995	team	individual	varying	Experimental vs. Control group Pre- vs. posttest
16 Wall & Clegg, 1981	team	individual	team for task design <sup>a</sup>	Pre- vs. posttests
17 Wall, Kemp, Jackson, & Clegg, 1986	team	individual	team for autonomy <sup>a</sup>	Experimental vs. Control group Pre- vs. posttest
18 Weisman, Gordon, Cassard, Bergner, & Wong, 1993	ć	individual	individual	Experimental vs. Control group

# TABLE 3: Level Issues in Quasi-Experimental and Correlational Studies

(continued)

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	Level of Theory	Level of Measurement	ltem Referent	Level of Analysis
Correlational studies				
19 Alper, Tjosvold, & Law, 1998	ż	individual	team	team
20 Campion, Medsker, & Higgs, 1993	team	individual	team	team
21 Campion, Papper, & Medsker, 1996	team	individual	team	team
22 Cohen, Ledford, & Spreitzer, 1996	team	individual	ż	team
23 Janz, 1999	i	individual	ż	Team & individual
24 Janz, Colquitt, & Noe, 1997	i	individual	team	team
25 Langfred, 2000	Team & individual	Team & individual	varying	team
26 Spreitzer, Cohen, & Ledford, 1999	team	individual	team	Team & individual
27 Van Mierlo, Rutte, Kompier, & Seinen, 2001	Team & individual	individual	varying	individual
28 Ward, 1997	2	individual	individual	individual

# TABLE 3 (continued)

NOTE: ? = level is unclear. a. In these studies, only items measuring task characteristics refer to the level of the work team.

et al., 1983; Wall & Clegg, 1981; Wall et al., 1986). In seven studies, the level to which items referred was not mentioned (Antoni, 1997; Batt & Appelbaum, 1995; Cohen et al., 1997; Hayslip et al., 1996; Lemke & Knauth, 1997; Melin, Lundberg, Soderlund, & Granqvist, 1999; Mueller & Cordery, 1992). Several authors suggested that data-collection strategies should direct respondents' attention to the predicted level of theory to increase the rigor of their research, and to avoid inconsistency between levels of theory and measurement (Klein et al., 1994). However, to our knowledge, this distinction between referring to the team and referring to the individual has not been subject to empirical investigation.

A remarkable observation in our review of (quasi-)experimental studies was that the majority of studies failed to report the exact number of teams in their research sample. Even of the five studies that specified the level of theory as that of the work team, only one reported the number of teams (Boonstra, 1998)!

The level of analysis refers to the level at which statistical procedures are performed. Quasi-experimental studies either compare a self-managing context (experimental group) to a more traditional work environment (control group) or compare a group of employees before the implementation of selfmanaging teams (pretest) to the same group after the implementation (posttest). In such a research design, the level of analysis is, by definition, the condition to which employees or teams are assigned. In most studies, the mean scores for conditions were calculated by averaging individual scores. This procedure ignores the fact that individual employees are members of teams. In multilevel jargon, individuals are "nested in teams." Ignoring this fact is inaccurate at best (e.g., Snijders & Bosker, 1999). Moreover, conclusions of studies using this procedure may relate only to individual employees. In two studies, the mean scores for condition were calculated by averaging group means (Cohen et al., 1997; Cohen & Ledford, 1994). In these studies, individual scores were first aggregated to form team scores. These team scores were subsequently averaged in mean scores for condition. Results of these studies may refer only to the work team. Conclusions with respect to individual employees would be inappropriate. Not all authors clearly demonstrated how they calculated the mean score for their experimental and control conditions. This is an important omission, because the precise analysis procedure determines the level to which conclusions may relate.

The quasi-experimental design certainly does offer ample possibility to simultaneously study differences among conditions, work groups, and individual employees (James & Williams, 2000). Unfortunately, authors in the domain of self-managing teamwork and well-being have not exploited these

possibilities. As a consequence, these studies may teach us about the different effects of working in a self-managing team as compared to working in a traditional work environment, but they provide little information on the mechanisms that may be responsible for these effects, or on possible differences between individual employees or between various self-managing work teams.

*Correlational studies.* Most authors in this category claimed that the level of theory for their study was the work team (Campion et al., 1993; Campion et al., 1996; Cohen et al., 1996; Langfred, 2000; Spreitzer et al., 1999; van Mierlo et al., 2001). However, none of them provided a strong rationale for this claim. The most extensive rationale was probably provided by Campion et al. (1993), stating that "All the job characteristics of Hackman and colleagues can be applied to groups, even though there have been few tests at the group level" (p. 826). Clearly, this statement does not clarify why the team level is judged appropriate. In four studies, authors were not specific about the level of theory (Alper, Tjosvold, & Law, 1998; Janz, 1999; Janz et al., 1997; Ward, 1997). Interestingly, two studies that examined the relationship between task autonomy and certain outcomes emphasized that autonomy can simultaneously reside at the group and individual level and specified separate research questions for group and individual autonomy (Langfred, 2000; Van Mierlo et al., 2001).

With regard to the level of measurement, all studies in this category used survey data from individual employees as their primary data source. In most studies, the survey items were consistent with the level of theory in that they referred to the level of interest. As such, authors who adopted the work team as the level of theory generally used survey items that referred to the work team. In some studies, the level of theory and/or the level to which the items referred were not reported, making it difficult for the reader to judge the appropriateness of the subsequent analysis procedures.

In one study, the level of analysis was the individual employee (van Mierlo et al., 2001), one study performed the analysis at the individual and group level (Janz et al., 1997), and the remaining eight studies reported data analysis at the group level. Performing group-level analysis when data are collected from individuals implies that individual scores are aggregated to the team level. Little is known about the implications of aggregating individual-level data. A number of conditions should be met before deciding to aggregate (Campion et al., 1993). First, one should have a clear rationale for aggregating that is well founded in theory. Second, it is recommended that survey items refer to the higher level entity. Third, one should be able to demonstrate how the individual perceptions are expected to add up to constitute a

meaningful higher level construct. Chan (1998) provided a useful typology of composition models that specify how lower level responses may be combined in a higher level construct. Finally, if the team-level construct is assumed to reflect something that is shared among team members, one should establish that agreement among individual members is sufficient to justify aggregation (Bliese, 2000).

The first condition was typically not met in correlational studies about self-managing teamwork and psychological well-being. In general, authors did mention the level of their theory but rarely provided a strong rationale for this choice. The second condition was met in five studies (Campion et al., 1993; Campion et al., 1996; Langfred, 2000; Spreitzer et al., 1999; van Mierlo et al., 2001). In the five remaining studies, authors failed to report their level of theory and/or the level of reference of their survey items. Therefore, we were not able to establish whether the second condition had been met. The third condition was met in only two studies (Campion et al., 1993; Campion et al., 1996). In these studies, the authors explicitly assumed a composition model for their team-level constructs, meaning that team members were expected to be sufficiently similar with respect to the construct in question that they could be characterized as a whole (Chan, 1998; Klein et al., 1994). The fourth condition was met in four studies (Campion et al., 1993; Campion et al., 1996; Janz, 1999; Janz et al., 1997).

Such rules of thumb for deciding whether we are dealing with individualor team-level constructs do not allow us to indisputably establish the true level of our constructs. This is clearly demonstrated by the following example: Where Cohen et al. (1996) calculated an aggregated score of individual autonomy and called this "group autonomy," Langfred (2000) calculated exactly the same score, emphatically referring to it as a measure of "individual autonomy."

Concluding, we can say that the correlational studies paid somewhat more attention to level issues compared to the (quasi-)experimental studies. Still, 40% of the studies failed to describe the level of theory, constructs were measured at the individual level, and the conditions for aggregating individual survey data were often not met.

## ISSUE 3: POSSIBLE CONSEQUENCES OF LEVEL CHOICES FOR STUDY RESULTS

*Quasi-experimental studies*. Level issues thus played a modest role in quasi-experimental studies in our sample. Authors generally do not specify the level of theory they are interested in, measure constructs at the individual level, and do not go beyond comparing experimental conditions. In this

absence of consideration of level issues, we are unable to discuss possible consequences of level choices for the results of studies in this category. What we can do is assess the appropriateness of conclusions and generalizations that authors present. If experimental and control conditions are compared based on aggregating individual scores, conclusions may relate only to individual employees. If, on the other hand, this comparison is made based on aggregating team scores, conclusions may exclusively relate to work teams. Psychological well-being is a typical individual-level phenomenon. Constructs such as work motivation, job satisfaction, and stress complaints are primarily associated with the individual employee, even though they are sometimes applied to groups. Therefore, we expect that it may be tempting for authors to generalize results to the individual level, even when aggregated team scores were used to compare conditions. Indeed, the two studies in our sample that used aggregated team scores referred to the individual employee when discussing results (Cohen et al., 1997; Cohen & Ledford, 1994). Cohen and Ledford (1994), for example, stated, "Thus, members of self-managing teams had higher levels of job satisfaction" (p. 35). Strictly speaking, they should have referred to the level of the work team.

In general, the apparent lack of consideration of multilevel issues in the quasi-experimental studies in our sample places major restrictions on the results that may be obtained. Although these studies can teach us something about general differences between situations with and without self-managing teams, authors can only theorize on the mechanisms that may be responsible for these differences. It would be interesting to gain insight into the mechanisms that may explain such differences, into individual characteristics that explain why individual employees may react differently to the same situation, or into (work) characteristics that may explain the relative success of a specific self-managing team.

We conclude that level issues deserve much more attention in quasiexperimental studies.

*Correlational studies*. In most studies in this category, the level of theory was the work team. An important implication of this choice is that the level of analysis should also be the work team. Furthermore, conclusions are limited to the level of the team, and generalization to any other level would be inappropriate. Authors seem to have respected this limitation, because we did not encounter inappropriate generalizations in the correlational studies in our sample.

The majority of the correlational studies in our sample presented only team-level results. It was therefore not feasible to assess whether the results would have been different had the authors adopted the individual level, or had taken a multilevel perspective. There are three exceptions.

Janz (1999) presented data analysis at the individual and team level. The individual-level data suggested positive correlations between autonomy and growth satisfaction, work motivation, and job satisfaction. However, at the level of the work team, none of these correlations was significant. Janz's study clearly demonstrates that results may be different from one level to another. If the author had specified the level of theory and analyzed the data accordingly, he would either have concluded that autonomy has a clear positive effect on the well-being outcomes or that autonomy has no effect at all.

More interesting, the only study in our sample that established a positive relationship between autonomy and job satisfaction performed data analysis at the individual level (Janz, 1999). As we mentioned before, this study found no evidence for this relationship at the team level of analysis. Moreover, two other studies that failed to find consistent support for a positive relationship between autonomy and satisfaction performed data analysis exclusively at the team level (Campion et al., 1993; Campion et al., 1996). Possibly, these combined results indicate that the relationship between autonomy and satisfaction is most meaningful at the level of the individual employee. Two other studies presented results at the individual and the team level (Langfred, 2000; van Mierlo et al., 2001).

Van Mierlo et al. (2001) demonstrated that team autonomy and individual autonomy as perceived by team members were clearly distinguishable constructs. Furthermore, individual autonomy was directly related to indicators of individual psychological well-being, whereas perceptions of team autonomy were only indirectly related to individual outcomes through their effect on the individual tasks of team members. Langfred (2000) investigated the effects of group and individual autonomy on group cohesiveness. Results indicated that group and individual autonomy affected group cohesiveness, but in opposite directions. Although group autonomy was related to lowered group cohesiveness.

Together, these three studies (Janz, 1999; Langfred, 2000; van Mierlo et al., 2001) present evidence for the assumption that the meaning and effects of constructs may change from one level of theory to the other. If the meaning of constructs indeed is different at different levels, it is plausible to assume that the choices for certain levels of theory, measurement, and analysis will affect the outcomes of a study. This conclusion further substantiates our claim that authors should make clear and conscious choices with regard to the organizational level they are interested in and should consistently incorporate these choices in the design of their studies.

#### DISCUSSION

In this article, we have presented a review of 28 empirical studies in the domain of self-managing teamwork and psychological well-being. First, we discussed the studies in a general way. The lack of agreement on which are the relevant outcome variables was noticeable. This was demonstrated by the large variety of outcome variables that have been studied. With regard to the quasi-experimental studies, the only variable that was consistently associated with the implementation of self-managing teamwork was job satisfaction. With regard to the correlational studies, the two most important design criteria for self-managing teams, task autonomy and variety, were consistently associated with a number of indicators for increased psychological well-being. Surprisingly, in the correlational studies, no consistent evidence was found for the relationship between task autonomy and job satisfaction. This seems to be contradictory to the outcomes of the quasi-experimental studies. A possible interpretation would be that self-managing teamwork does increase job satisfaction, but not through increased autonomy. Altogether we conclude that we still know surprisingly little about the effects of this popular form of work design on the well-being of its incumbents.

Second, we discussed issues of level of theory, measurement, and analysis in the studies of our review sample. In the quasi-experimental category, level issues barely received any attention. Authors occasionally mentioned the level they aimed at but failed to provide sound argumentation for their choice. Data were typically collected at the level of the individual employee and aggregated to the level of the experimental condition. This procedure yields no information about why certain effects occur, nor does it provide insight into differences between individuals or work teams. Moreover, in their analyses, these studies ignored the fact that employees are members of work teams. This does no justice to the multilevel character of the domain of self-managing teamwork. In the correlational studies, level issues received more attention. Authors more frequently described the level of interest, even though they still failed to substantiate this choice with strong arguments. Data were typically collected from individual employees, but items often referred to characteristics of the work team. In many cases, analyses were applied to team-level data, after aggregation of individual responses. As such, individual ratings of psychological well-being were also aggregated to the team level. In our opinion, this does no justice to the essential individuallevel character of the concept of psychological well-being (Sonnentag, 1996). In addition, interpretation of aggregated measures is certainly ambiguous. This is demonstrated by our finding that two studies used the same measure based on aggregation of individual scores. In one study the measure was referred to as team-level autonomy (Cohen et al., 1996), while the other claimed to measure individual autonomy (Langfred, 2000).

Third, we argued and provided some evidence that the choices for certain levels of theory, measurement, and/or analysis will affect the outcomes of a study. Although during the last decade, level issues have increasingly gained interest in many domains in organizational and industrial psychology, this development has largely passed by the domain of self-managing teamwork. We find this unfortunate, because this domain is certainly not immune to level issues.

In this article, we concentrated on level issues with regard to content. However, multilevel issues also have methodological implications. Individuals who are members of the same team will frequently share important perceptions and behaviors. As a result, their responses on individual survey items may not be truly independent, but colored by their group membership. In such a case, an important basic assumption for many common statistical procedures is violated, because these procedures assume independence of observations. In some cases, this may lead to serious overestimation of parameters. Therefore, even if one is not particularly interested in the multilevel character of one's research domain, one is almost obliged to take it into account as a nuisance that may distort results. This problem may be even more pronounced in the study of self-managing teamwork, because in the absence of hierarchical leadership such teams often may develop shared norms and values that are more rigid than in many other types of teams (Barker, 1993). None of the studies in the domain of self-managing teamwork and psychological well-being in our review sample referred to this problem or took it into account in statistical analyses. This is unfortunate, especially because statistical procedures for the analysis of multilevel data are now readily available (e.g., Bryk & Raudenbush, 1992; Kreft & De Leeuw, 1998; Snijders & Bosker, 1999).

Our conclusions with respect to level issues in the domain of self-managing teamwork and well-being are in line with those of Yammarino et al. (2002) in the domain of leadership. They too concluded that level issues in the domain of leadership have not received the attention they deserve.

From our review, we derive two major recommendations for future research. First, more research is needed to establish the effects of self-managing teamwork on team member psychological well-being. Second, this research should take into account multilevel issues. Together, these recommendations should result in a multilevel theoretical framework of the relationship between self-managing teamwork and psychological well-being.

We would like to propose a number of themes that may be incorporated in such a framework, and that have until now been rather underexposed. In the

first place, the simultaneous study of characteristics at the team and individual level seems promising. Introducing self-managing teamwork is an intervention at the team level that is characterized, among other things, by increased autonomy and variety at the team level (Cordery, 1996). Psychological well-being, on the contrary, is a concept that principally resides at the individual level (Sonnentag, 1996). As such, characteristics of the individual task may be more predictive of individual psychological well-being than characteristics of the team task.

In the second place, characteristics of the team task provide the preconditions for the design of individual tasks within the team. This observation evokes the question of how tasks and responsibilities are distributed among team members. Do all members get an equal part, or do one or few members take the lion's share? Which of these options is preferable? These questions refer to the relationship between characteristics of the team and the individual task.

A related question concerns the factors that contribute to shaping this relationship. At the team level, for example, an open and tolerant social climate may invite members to experiment with new tasks and responsibilities, whereas a narrow-minded, intolerant climate may result in hesitance to do so. At the individual level, a confident team member may be more inclined to take on extra responsibilities or new tasks than a coworker who is less confident. When addressing these and additional research questions, authors should take into account their multilevel character. By addressing such questions we could gain important new knowledge about self-managing teamwork, catch up with current developments in group research, and as such, bring research in the domain of self-managing teamwork to a higher level.

#### REFERENCES

- Alper, S., Tjosvold, D., & Law, K. S. (1998). Interdependence and controversy in group decision making: Antecedents to effective self-managing teams. *Organizational Behavior & Human Decision Processes*, 74, 33-52.
- Antoni, C. H. (1997). Soziale und ökonomische Effekte der Einführung teilautonomer Arbeitsgruppen: Eine quasi-experimentelle Längsschnittsstudie [Social and economic effects of introducing semi-autonomous work groups: A quasi experimental longitudinal study]. Zeitschrift für Arbeits- und Organisationspsychologie, 41, 131-142.
- Banker, R. D., Field, J. M., Schroeder, R. G., & Sinha, K. K. (1996). Impact of work teams on manufacturing performance: A longitudinal field study. *Academy of Management Journal*, 39, 867-890.
- Barker, J. R. (1993). Tightening the iron cage: Concertive control in self-managing teams. Administrative Science Quarterly, 38, 408-437.

#### van Mierlo et al. / SELF-MANAGING TEAMWORK AND WELL-BEING 233

- Batt, R., & Appelbaum, E. (1995). Worker participation in diverse settings: Does the form affect the outcome, and if so, who benefits? *British Journal of Industrial Relations*, 33, 353-378.
- Bliese, P. D. (2000). Within-group agreement, non-independence, and reliability: Implications for data aggregation and analysis. In K. J. Klein & S. W. J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions* (pp. 349-381). San Francisco: Jossey-Bass.
- Boonstra, J. J. (1998, July). Team working: Effects on the quality of working life, organisational climate and productivity. Paper presented to the International Work Psychology Conference, Institute of Work Psychology, University of Sheffield, U.K.
- Bryk, A. S., & Raudenbush, S. W. (1992). Hierarchical linear models, applications, and data analysis methods. Newbury Park, CA: Sage.
- Campbell, D. T., & Stanley, J. C. (1963). Experimental and quasi-experimental designs for research. Chicago: Rand McNally.
- Campion, M. A., Medsker, G. J., & Higgs, A. C. (1993). Relations between work group characteristics and effectiveness: Implications for designing effective work groups. *Personnel Psychology*, 46, 823-850.
- Campion, M. A., Papper, E. M., & Medsker, G. J. (1996). Relations between work team characteristics and effectiveness: A replication and extension. *Personnel Psychology*, 49, 429-452.
- Chan, D. (1998). Functional relations among constructs in the same content domain at different levels of analysis: A typology of composition models. *Journal of Applied Psychology*, 83, 234-246.
- Cohen, S. G., & Bailey, D. E. (1997). What makes teams work: Group effectiveness research from the shop floor to the executive suite. *Journal of Management*, 23, 239-290.
- Cohen, S. G., Chang, L., & Ledford, G. E., Jr. (1997). A hierarchical construct of self-management leadership and its relationship to quality of work life and perceived work group effectiveness. *Personnel Psychology*, 50, 275-308.
- Cohen, S. G., & Ledford, G. E., Jr. (1994). The effectiveness of self-managing teams: A quasi experiment. *Human Relations*, 47, 13-43.
- Cohen, S. G., Ledford, G. E., Jr., & Spreitzer, G. M. (1996). A predictive model of selfmanaging work team effectiveness. *Human Relations*, 49(5), 643-676.
- Cordery, J. L. (1996). Autonomous work groups and quality circles. In M. West (Ed.), Handbook of workgroup psychology (pp. 225-246). Chichester, UK: Wiley.
- Cordery, J. L., Mueller, W. S., & Smith, L. M. (1991). Attitudinal and behavioral effects of autonomous group working: A longitudinal field study. *Academy of Management Journal*, 34(2), 464-476.
- Cummings, T. G. (1978). Self-regulating work groups: A socio-technical synthesis. Academy of Management Review, 1(3), 625-634.
- Elmuti, D., & Kathawala, Y. (1997). Self-managing teams, quality of work life, and productivity: A field study. *Mid-American Journal of Business*, 12, 19-25.
- Goodman, P. S., Devadas, R., & Hughson, T. L. G. (1988). Groups and productivity: Analyzing the effectiveness of self-managing teams. In J. P. Campbell & R. J. Campbell (Eds.), *Productivity in organizations* (pp. 295-325). San Francisco: Jossey-Bass.
- Hackman, J. R. (1987). The design of work teams. In J. W. Lorsch (Ed.), Handbook of organizational behavior (pp. 315-342). Englewood Cliffs, NJ: Prentice Hall.
- Hackman, J. R., & Oldham, G. R. (1975). Development of the Job Diagnostic Survey. Journal of Applied Psychology, 60, 159-170.
- Hayslip, B., Jr., Miller, C., Beyerlein, M. M., Johnson, D., Metheny, W., & Yeatts, D. (1996). Employee age and perceptions of work in self-managing and traditional work groups. *International Journal of Aging & Human Development*, 42, 291-312.

- James, L. R., & Williams, L. J. (2000). The cross-level operator in regression, ANCOVA, and contextual analysis. In K. J. Klein & S. W. J. Kozlowski (Eds.), *Multilevel theory, research,* and methods in organizations: Foundations, extensions, and new directions (pp. 382-424). San Francisco: Jossey-Bass.
- Janz, B. D. (1999). Self-directed teams in IS: Correlates for improved systems development work outcomes. *Information & Management*, 35, 171-192.
- Janz, B. D., Colquitt, J. A., & Noe, R. A. (1997). Knowledge worker team effectiveness: The role of autonomy, interdependence, team development, and contextual support variables. *Personnel Psychology*, 50, 877-904.
- Kemp, N. J., Wall, T. D., Clegg, C. W., & Cordery, J. L. (1983). Autonomous work groups in a greenfield site: A comparative study. *Journal of Occupational Psychology*, 56, 271-288.
- Klein, K. J., Dansereau, F., & Hall, R. J. (1994). Levels issues in theory development, data collection, and analysis. Academy of Management Review, 19, 195-229.
- Klein, K. J., & Kozlowski, S. W. J. (2000). Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions. San Francisco: Jossey-Bass.
- Kreft, I. G. G., & De Leeuw, J. (1998). Introducing multilevel modeling. London: Sage.
- Kuipers, H., & Van Amelsfoort, P. (1994). Slagvaardig organiseren: inleiding in de sociotechniek als integrale ontwerpleer [An introduction to socio-technique as an integrated theory of work design]. Deventer, The Netherlands: Kluwer Bedrijfswetenschappen.
- Langfred, C. W. (2000). The paradox of self-management: Individual and group autonomy in work groups. *Journal of Organizational Behavior*, 21, 563-585.
- Lawler, E. E., Mohrman, S. A., & Ledford, G. E. (1995). Creating high performance organizations: Practices and results of employee involvement and total quality management in Fortune 1000 companies San Francisco: Jossey-Bass.
- Lemke, S., & Knauth, P. (1997). Arbeitspsychologische und betriebswirtschaftliche Effekte der Einführung teilautonomer Gruppenarbeit in einem Automobielwerk [Work psychological and economic effects of the introduction of partially autonomous group work in a car factory]. Zeitschrift für Arbeits- und Organisationspsychologie, 41, 191-197.
- Melin, B., Lundberg, U., Soderlund, J., & Granqvist, M. (1999). Psychological and physiological stress reactions of male and female assembly workers: A comparison between two different forms of work organization. *Journal of Organizational Behavior*, 20, 47-61.
- Mueller, W. S., & Cordery, J. L. (1992). The management of strategies for internal labour market flexibility. In D. M. Hosking & N. Anderson (Eds.), Organizational change and innovation: Psychological perspectives and practices in Europe (pp. 208-221). London: Routledge.
- Ostroff, C. (1993). Comparing correlations based on individual-level and aggregated data. *Journal of Applied Psychology*, 78, 569-582.
- Parker, S. K., Wall, T. D., & Cordery, J. L. (2001). Future work design research and practice: Toward an elaborated model of work design. *Journal of Occupational & Organizational Psychology*, 74, 413-440.
- Pearson, L. (1992). Autonomous workgroups: An evaluation at an industrial site. Human Relations, 45(9), 905-936.
- Rao, A., Thornberry, N., & Weintraub, J. (1987). An empirical study of autonomous work groups: Relationships between worker reactions and effectiveness. *Behavioral Science*, 32, 66-76.
- Robinson, W. S. (1950). Ecological correlations and the behavior of individuals. American Sociological Review, 15, 351-357.
- Seers, A., Petty, M. M., & Cashman, J. F. (1995). Team-member exchange under team and traditional management: A naturally occurring quasi-experiment. *Group & Organization Man*agement, 20, 18-38.

#### van Mierlo et al. / SELF-MANAGING TEAMWORK AND WELL-BEING 235

- Snijders, T.A. B., & Bosker, R. J. (1999). Multilevel analysis: An introduction to basic and advanced multilevel modeling. London: Sage.
- Sonnentag, S. (1996). Work group factors and individual well-being. In M. A. West (Ed.), Handbook of work group psychology (pp. 345-367). New York: Wiley.
- Spreitzer, G. M., Cohen, S. G., & Ledford, G. E., Jr. (1999). Developing effective self-managing work teams in service organizations. *Group & Organization Management*, 24, 340-366.
- Trist, E. L., & Bamforth, K. W. (1951). Some social and psychological consequences of the Longwall method of coal-getting. *Human Relations*, 4, 3-38.
- van Mierlo, H., Rutte, C. G., Kompier, M. A. J., & Seinen, B. (2001). Autonomous teamwork and psychological well-being. *European Journal of Work & Organizational Psychology*, 10, 291-301.
- Wall, T. D., & Clegg, C. W. (1981). A longitudinal field study of group work redesign. *Journal of Occupational Behavior*, 2, 31-49.
- Wall, T. D., Kemp, N. J., Jackson, P. R., & Clegg, C. W. (1986). Outcomes of autonomous work groups: A long-term field experiment. Academy of Management Journal, 29, 280-304.
- Ward, E. A. (1997). Autonomous workgroups: A field study of correlates of satisfaction. Psychological Reports, 80, 60-62.
- Weisman, C. S., Gordon, D. L., Cassard, S. D., Bergner, M., & Wong, R. (1993). The effects of unit self-management on hospital nurses' work process, work satisfaction, and retention. *Medical Care*, 31, 381-393.
- Yammarino, F. J., Dionne, S., & Uk Chun, J. (2002). Transformational and charismatic leadership: A levels-of-analysis review of theory, measurement, data analysis, and inferences. *Leadership*, 23-63.

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