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**How Efficacy Beliefs predict Collaborative Practice: a Two-wave Study among Intensive
Care Unit (ICU) Nurses**

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Version: July 2009

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ABSTRACT

Title. How Efficacy Beliefs predict Collaborative Practice: a Two-wave Study among Intensive Care Unit (ICU) Nurses.

Aims. The aim of the present study was to investigate in what way Intensive Care Unit (ICU) nurses' efficacy beliefs, i.e. beliefs on their work-related competences, and commitment to their work team are related to the quality of collaborative practice between ICU-nurses and physicians over time.

Background. Recent empirical studies in the field of work and organizational psychology demonstrated that (professional) efficacy beliefs are reciprocally related to workers' resources and well-being over time, resulting in a positive gain spiral. Moreover, there is ample evidence that workers' affective commitment to their organization or work-team is related to desirable work behaviours such as citizenship behaviour. The present study aimed at integrating these two lines of research, and testing the resulting research model in an ICU-setting.

Methods. A longitudinal design was applied to questionnaire data from the EURICUS-project. The study sample consisted of 372 nurses working in 29 different European Intensive Care Units. Data were collected in 1997 and 1998. More specifically, we tested the hypotheses that (i) the relationship between efficacy beliefs and collaborative practice is mediated by team commitment, and (ii) efficacy beliefs, team commitment and collaborative practice are reciprocally related.

Results. Both hypotheses were supported by the results of Structural Equation Modelling, suggesting a potential positive gain spiral of efficacy beliefs.

Conclusion. The results of this study emphasize the importance of creating a work environment that is conducive to ICU-nurses' professional efficacy beliefs, which could be achieved by providing them with sufficient resources to perform their job well.

SUMMARY STATEMENT

What is already known about this topic

- Efficacy beliefs are reciprocally related to job resources and to positive work-related well-being over time.
- ICU-nurses' level of affective commitment to their work team is positively related to ICU medical performance.

What this paper adds

- Affective commitment to the work team is a mediating factor in the reciprocal relationships between ICU-nurses' efficacy beliefs and collaborative practice.
- Strengthening ICU-nurses' efficacy beliefs will enhance collaborative practice over time, whereas in turn high quality collaborative practice will boost ICU nurses' efficacy beliefs as well.

Implications for practice and/or policy

- Health care institutions should create working environments that provide ICU-nurses with sufficient resources to perform their job well.
- Further research is needed to design and evaluate interventions for the enhancement of collaborative practice in ICUs.

Keywords: efficacy beliefs, team commitment, collaborative practice, ICU nurses, questionnaires, gain spiral, well being

INTRODUCTION

The need for effective health care organizing has become as pressing as the need for medical breakthroughs. According to Ramanujam and Rousseau (2006), the fundamental challenges the health care industry faces nowadays are organizational instead of clinical. Due to the increasing specialization in the day-to-day task environment of health care organizations, care providers from different disciplines have become increasingly interdependent, and effective interdisciplinary communication has become critical for the quality of patient care. However, in most health care organizations (e.g., hospitals) the core of staff is comprised of professionals whose socialization mainly occurs pre-employment, resulting in a strong professional identification (Garman, Leach, & Spector, 2006; Hoff, Pohl, & Bartfield, 2006). Many health care organizations, however, attempt little or no socialization of their own workforce in order to promote organizational identification (Meyer, Allen, & Smith, 1993, in: Ramanujam & Rousseau, 2006). Consequently, differences in professional practices and care giving behaviours may eventually hinder effective interdisciplinary collaboration.

There's a pressing need to change this current state of affairs, as team structures where workers commit to work collaboratively are the basic units of organizing where work is highly interdependent and timeframes are tight (Goodman, Ravlin, & Schminke, 1987). According to Bailey & Sandy (1999), the team approach in health care entails that members of health care teams will have to adopt a more holistic view of the care giving process rather than being concerned only with issues and problems that arise from their own specialized tasks. The present study is about working together as a health-care team in a collaborative way, and specifically about psychosocial determinants of this so-called collaborative practice between nurses and physicians at Intensive Care Units (ICUs), i.e., efficacy beliefs and team commitment.

BACKGROUND

Collaborative practice

The concept of '*collaborative practice*' is defined by Weiss and Davis (1985; p. 299) as "the interactions between nurses and physicians that enable the knowledge and skills of both professionals to synergistically influence the patient care provided". Whereas interaction refers to open communication, synergy implies working together in solving problems. Another, more extensive description of collaborative practice is provided by Taylor (1996, p. 69) who defines it as "the recognition and respect for each participant's unique expertise in health care delivery. Doctors and nurses work together non-hierarchically in contributing to decisions made together about the patients. The relationship is characterized by trust and mutual communication". In addition to open communication and cooperative problem solving, this definition also emphasizes mutual recognition for each other's professional expertise. In line with both of the above definitions, in the current study, three core dimensions were used to assess collaborative practice: open communication, cooperative problem solving and professional recognition.

Especially in Intensive Care Units (ICUs), collaborative practice was found to be of utmost importance, as it improves the clinical outcome of patient care (e.g., see Baggs et al., 1999; Taylor, 1996). This is not surprising, considering the fact that ICU nurses and physicians carry out very complex tasks, which require careful tuning. The EURICUS-I study was performed in 12 European countries and explored the relationships between the organization and management of Intensive Care Units and their medical performance (Reis Miranda, Ryan, Schaufeli, & Fidler, 1997). Results of this study showed that ICUs where staff are not strictly confined to their own tasks and functions, but may exchange and substitute each other wherever and whenever required, perform better.

According to Stein-Parbury and Liaschenko (2007), the ICU is an appropriate setting for an analysis of collaboration between nurses and physicians, because it is the context considered the prototype of interdependent teamwork in health care. More recently conducted studies among ICU staff also lend support to the focal role of collaborative practice for ICU functioning. For instance, in a study among staff members of 14 ICUs in two different US hospitals, Hamric and Blackhall (2007) found that the quality of nurse-physician collaboration was significantly related to care providers' satisfaction with care, moral distress, and ICU ethical climate. Manojlovic and DeCicco (2007) surveyed a sample of 866 US ICU nurses, and showed that nurse-physician communication was predictive of nurse-assessed medication errors. In another US study among medical, surgical, and intensive care units, nurse-physician collaboration turned out to be the only direct predictor of patient satisfaction with hospital nursing care (Larrabee et al., 2004). Finally, several studies demonstrated that when adequate collaboration does not occur, it can have negative outcomes for patients and their families (e.g., Azoulay & Sprung, 2004; Levy, 2001).

Moreover, there is still room for improvement in ICU collaborative practice. Physicians often dismiss and devalue nurses' knowledge, perceive themselves as the primary decision makers in healthcare, and feel free to change treatment plans without consultation (e.g., Coombs, 2003). Therefore, it is not surprising that, compared to physicians, ICU-nurses perceive lower levels of collaboration and are less satisfied with that collaboration (Hamric and Blackhall, 2007; Miller, 2001; Thomas, Sexton & Helmreich, 2003). In a qualitative study among German ICU nurses, Knoll & Lendner (2008) described the culture of ICU-communication as being highly physician dominated, resulting in a considerable adverse effect on the flow of patient information between nurses and physicians, and in barriers for nurses to participate actively with their knowledge and professional competence in the process of decision making. In a systematic literature review of 22 studies, nurses' lack of

involvement in the plan of care and comfort, and disagreement among physicians and other healthcare team members were listed among the main barriers to effective terminal care provision in ICUs (Espinosa, Young & Walsh, 2008).

Therefore, (more) empirical research on individual and group factors that contribute to good collaborative practice would seem important. Recently, several studies - which will be discussed in more detail in the following sections - have provided evidence of the strong motivational potential of two psychosocial factors in the work setting, i.e. efficacy beliefs (as an individual factor or personal resource) and team commitment (as a group factor or social resource). The present study is the first one to investigate in what way Intensive Care Unit nurses' efficacy beliefs and team commitment are related to the quality of collaborative practice between nurses and physicians.

Efficacy beliefs

According to Social Cognitive Theory (Bandura, 1997, 1999, 2001) people differ in their beliefs about their competences and success in different areas of their life. These "...beliefs in one's capabilities to organise and execute the courses of action required to produce given attainments" are labelled 'self-efficacy' (Bandura, 1997, p. 3). There is considerable evidence for the positive effects of self-efficacy on performance and health in different domains such as the workplace, school, and sports (Bandura, 1999, 2001). For example, recent research shows that efficacy beliefs are pivotal in coping with stress and in enhancing psychological well-being (e.g., Salanova, Peiró, & Schaufeli, 2002; Llorens, Schaufeli, Bakker, & Salanova, 2007).

Within the Conservation of Resources (COR) theory (Hobfoll, 1989, 2001), this type of beliefs is classified under the category of (personal) resources. Resources are defined as "...those objects, personal characteristics, conditions or energies that are valued by the individual or that serve as a means for attainment of these objects, personal characteristics,

conditions or energies” (Hobfoll, 1989, p. 516). According to Hobfoll (1989), resources have a strong motivational potential, which is in line with Bandura’s (1997) view that efficacy beliefs may act as an important determinant of the effort and persistence that people will invest in pursuing goals, or in other words: their level of *motivation* (Katzell & Thompson, 1990; Locke & Latham, 1990).

Since resources enable the acquisition or preservation of more resources, people are motivated to create and invest resources in order to enrich their resource pool. For instance, workers invest time for the salary that will afford them a reasonable life style, and job security (Hobfoll & Freedy, 1993). The COR model predicts that when such investments do provide a good return and, consequently goals are achieved, people experience this as a gain which increases the resource pool, and makes it more likely that more resources will subsequently be acquired. Accordingly, those workers who gain resources are most likely to gain more resources in the near future, generating a positive ‘gain spiral’ of resources found in previous empirical studies (e.g., Llorens et al., 2007; Salanova et al., 2005).

Recent empirical studies (e.g., Salanova, Peiró, & Schaufeli, 2002) convincingly demonstrated that using a domain-specific measure of efficacy beliefs - instead of a general measure - yields more robust results because a person’s self-efficacy belief is likely to differ depending on the activity to which it is related (Bandura, 1997, 1999). Therefore, in the current study, a work-specific measure of efficacy beliefs was used, i.e. the concept of ‘perceived professional efficacy’ that is derived from the literature on burnout (Maslach & Jackson, 1981; Schaufeli, Leiter, Maslach, & Jackson, 1996). Several scholars actually consider burnout as a ‘crisis in professional efficacy’ (Leiter, 1992; Cherniss, 1980).

For ICU-nurses, there is much to be gained in changing a more traditional, hierarchical working relationship with physicians into egalitarian collaborative practice. Therefore, following Bandura’s (1997) view of the motivational potential of efficacy beliefs, a higher

level of ICU-nurses' professional efficacy will probably go together with more effort (and persistence) in pursuing the highly valued goal of collaborative practice. In the present study, we expect the relationship between nurses' efficacy beliefs and collaborative practice to be positive.

Team commitment

Commitment in the workplace can take various forms and different foci, amongst others organizational commitment that can be defined as a psychological state that binds the individual to the organization (Allen & Meyer, 1990). In a meta-analysis on the antecedents, correlates and consequences of the three subdimensions of organizational commitment, Meyer, Stanley, Herscovich and Topolnytsky (2002) showed that affective commitment has the strongest, positive correlation with desirable work behaviours (i.e., attendance, job performance and organizational citizenship behaviour). Affective commitment is defined as "the individual's emotional attachment to, identification with, and involvement in the organization" (Meyer & Allen, 1991, p.67), and is governed by free choice, whereas this is not, or to a lesser extent, the case for continuance and normative commitment. Individuals with a strong affective commitment continue employment with the organization because they *want* to do so" (Meyer & Allen, 1991, p.67), whereas individuals with a strong continuance or normative commitment continue employment because they feel they *should* do so. Therefore, it is not surprising that especially affective commitment is strongly related to positive outcomes.

Team commitment is the psychological attachment that members feel towards their (work) team, and which is analogous to organizational commitment except that the target of the attachment is the team rather than the larger organization. In a study by Pierce and Herbig (2004), it was found that team commitment had a large effect on team citizenship behaviour. The more committed members were to their team, the more they engaged in behaviours that

are beneficial to their team. Based on this, we expect to find a positive relationship between team commitment and collaborative practice in the present study. Moreover, in the EURICUS-I study (Reis Miranda, Ryan, Schaufeli, & Fidler, 1997), ICU-nurses level of affective commitment to their work team, i.e., the strength of their identification with and involvement in the ICU, was one of the factors that was most strongly related to the medical performance of ICUs. The higher the level of nurses' affective commitment to their work-team, the better their ICU's clinical outcome of patient care (in terms of Standardized Mortality Ratios) was. One could speculate that team commitment affects medical performance through its (positive) effect on the quality of collaboration within the ICU-team.

Quite interestingly, in their recent meta-analysis, Meyer et al. (2002) also found two individual difference variables to be significantly correlated with affective commitment, i.e. external locus of control and task efficacy. The latter concept is quite comparable to professional efficacy. Apparently, the motivational potential of efficacy beliefs may also extend itself to the context in which tasks are performed. This is confirmed by a recent study among teams of MBA-students participating in a negotiation simulation, showing that efficacy beliefs are predictive of commitment, in terms of team members' intent to remain in the team (Bayazit & Mannix, 2003). In line with these findings, it may be speculated for the present study that the higher the level of ICU-nurses' professional efficacy, the more committed they will be to their ICU work-team.

In the previous section, we already postulated a positive relationship between ICU nurses' efficacy beliefs and collaborative practice. A logical next question then is whether or not these concepts are directly related to one another. Based on the above, we expect that the relationship between ICU-nurses' (professional) efficacy beliefs and collaborative practice is mediated by team commitment, in the sense of affective commitment.

Reciprocal causation

In the preceding paragraphs, we explained that according to the Social Cognitive Theory of Bandura, efficacy beliefs may act as powerful predictors (or antecedents) of well-being (such as team commitment) and organizational behaviour (such as collaborative practice). However, the recent literature also provides empirical examples of reversed causal relationships between resources such as efficacy beliefs and mental health or well-being (e.g., Schwarzer, Hahn, & Jerusalem, 1993), and even of reciprocal causation. For example, in a two-wave longitudinal study among teachers, Llorens, García and Salanova (2005) found that poor efficacy beliefs lead to exhaustion and cynicism – the core of burnout – and vice versa. This is not surprising, as people also rely on their affective states to judge their capabilities (see e.g., Salanova, Grau, Llorens, & Schaufeli, 2001). From a Positive Psychology perspective, in another two-wave study among teachers, Llorens, García, Salanova and Cifre (2003) found that job resources (i.e., easy access to information and relevant materials) increase work engagement and future efficacy beliefs, whereas in the reversed direction, engagement and efficacy beliefs increase the availability of resources. Llorens et al. (2007) carried out a two-wave study among Spanish university students who had to perform two group problem-solving tasks by means of computers in a laboratory setting. Their results showed the existence of a positive ‘gain spiral’. Efficacy beliefs played a mediating role between task resources and engagement. Moreover, engagement increased efficacy beliefs, which in turn increased task resources over time. Finally, in a two-wave study among teachers, Salanova, Bakker and Llorens (2006) found that efficacy beliefs have a reciprocal effect on social resources (i.e., organizational social climate) and well-being (i.e., flow). The latter studies point to the existence of a potential positive ‘gain spiral’ in which efficacy beliefs play an important role.

Thus, it should be noted that even though Social Cognitive Theory emphasizes the strong, predicting role of efficacy beliefs, their relationships with other psychosocial

constructs and behaviour should be considered reciprocal in nature. The present longitudinal study focuses on the causal (reciprocal) relationships between efficacy beliefs, team commitment and collaborative practice in a sample of ICU-nurses. Novelties of the present study are that efficacy beliefs play a predicting role in the model, and that not only work-related well-being (i.e., team commitment) but also work behaviour (i.e., collaborative practice) have been included as well. Our research model is depicted in Figure 1.

INSERT FIGURE 1 ABOUT HERE

THE STUDY

Aim

The objective of the present study was to investigate whether ICU-nurses' efficacy beliefs predict future collaborative practice, and to test the potential mediating role of team commitment in this relationship. Based on the line of reasoning that we presented, the following hypotheses were formulated:

Hypothesis 1: Team commitment mediates the relationship between ICU nurses'

(professional) efficacy beliefs on the one hand and collaborative practice on the other hand.

Hypothesis 2: Efficacy beliefs, team commitment, and collaborative practice are reciprocally related. In addition to the relationship of efficacy beliefs with collaborative practice via team commitment, it is hypothesized that team commitment leads to stronger efficacy beliefs (*Hypothesis 2a*), and that collaborative practice leads to more team commitment (*Hypothesis 2b*).

Design

A longitudinal questionnaire survey design was adopted.

Participants

The EURICUS-project (European ICU Studies), consisting of three complementary studies, was designed in order to study ICUs as an health care sub-system (see Reis-Miranda, Rivera-Fernandéz, & Nap, 2007, for an overview). A convenience sample of ICU-nurses was recruited via the personal network of the project leader. For the present study, data of 429 ICU-nurses from 8 different European countries were used, who filled out an extensive questionnaire on collaborative practice and work-related well-being twice (with a time interval of 15 months in between). The questionnaire was translated from English to the language of the different participating countries, and then back-translated to English by bilingual researchers and experts in the field of intensive care nursing. Questionnaires with missing values on any of the study variables were removed from the dataset, leaving data from 372 nurses that could be used to test our research model. There were no significant differences between the study sample and the nurses that were removed from the dataset as regards gender distribution ($\chi^2 = 3.89, p > .05$), mean age ($t = -.06; p > .10$) or mean tenure ($t = -.17; p > .10$), indicating that dropout was not selective.

Measures

Efficacy beliefs were measured with the respective subscale of the Maslach Burnout Inventory-HSS (Maslach, Jackson & Leiter, 1996), consisting of seven items. A sample item is 'I can effectively solve the problems that arise in my work'. All items are scored on a seven-point Likert scale (1=never, 7=every day).

Team commitment was assessed by means of three scales, which are based on the Shortell ICU Nurse-Physician Questionnaire (Shortell et al., 1991) and are related to the aspects of affective commitment as defined by Myer & Allen (1991, p. 67). The first two scales, consisting of two items each, were related to identification with the ICU (e.g., 'I identify with the goals and objectives of this ICU') and involvement in the ICU (e.g., 'I feel I'm a part of

this ICU'). The third scale, consisting of three items, deals with the individual's emotional attachment to the ICU (e.g., 'If I had the chance to do the same kind of work for the same pay in another unit of the hospital, I wouldn't go'). All items are scored on a five point Likert-scale (1 =strongly disagree, 5= strongly agree).

Collaborative practice was assessed by means of three scales: open communication, cooperative problem solving, and professional recognition. Open communication is measured by five items (e.g., 'Communication between nurses and physicians in this ICU is very open'), and cooperative problem solving is measured by four items (e.g., 'Nurses and physicians all contribute from their experience and expertise to produce a high quality solution for work-related problems') from the Shortell ICU Nurse-Physician Questionnaire (Shortell et al., 1991) that are scored on five-point Likert Scales (1=not at all likely, 5=almost certainly). Professional recognition is measured by six items (e.g., 'Concerning the success of patient care, physicians understand that the work of nurses is as important as their own work') from the Collaborative Practice Scale (Weiss & Davis, 1985) that are scored on a five-point Likert Scale (1=never, 5 =always).

Data were collected during an 15-month period in 1997-1998. However, they can still be considered of contemporary relevance, according to the papers that are cited in the Introduction. Moreover, our research model cannot be considered dated either as it deals with fundamental psychosocial processes, i.e. it is made up of relationships between psychosocial constructs which are not dependent upon the spirit of the times.

Ethical considerations

The study was approved by the Ethical Committees of the participating hospitals. Informed consent was waved. Before completing the questionnaire, participants received information about the study. Confidentiality was maintained by using numbers to identify participants.

Data analysis

Before performing the analyses described below, we checked all variables for normality (i.e. skewness and kurtosis), and no violations of the assumption of normality was observed. Means, standard deviations, Cronbach's alpha coefficients and bivariate correlations were computed for all scales used in this study. Next, a measurement model including all scales was tested on Time 1 (T1) data by means of Confirmatory Factor Analysis (CFA) implemented by the AMOS software program (Arbuckle, 1997). Finally, Structural Equation Modeling (SEM) by the AMOS program was used to establish the relationships between the model variables. As our study sample included ICU nurses from different European countries, we controlled for country in the subsequent analyses. First, the *Stability Model* (Model 1; M1) was tested without cross-lagged structural paths but with temporal stabilities and synchronous correlations. Temporal stabilities were specified as correlations between the corresponding constructs at Time 1 (T1) and Time 2 (T2). Model 1 estimates the total stability coefficient between T1 and T2 without specifying the variance in direct or indirect paths (Pitts, West, & Tein, 1996). Secondly, the fit of the stability model was compared to that of three more complex models: (a) the *Causality Model* (Model 2; M2), which is identical to M1 but includes additional cross-lagged structural paths from T1 efficacy beliefs to T2 team commitment and to T2 collaborative practice, as well as from T1 team commitment to T2 collaborative practice; (b) the *Reversed Causation Model* (Model 3; M3), which is also identical to M1, but includes additional cross-lagged structural paths from T1 collaborative practice to T2 team commitment and T2 efficacy beliefs, as well as from T1 team commitment to T2 efficacy beliefs; (c) the *Reciprocal Model* (M4), which includes reciprocal relationships between efficacy beliefs, team commitment, and collaborative practice and thus includes all paths of M2 and M3. In addition, the measurement errors of the corresponding observed variables collected at different time points were allowed to co-vary over time (e.g., a covariance is specified between the measurement error of open communication at T1 and the

measurement error of open communication at T2). While generally in cross-sectional models measurement errors should not be allowed to co-vary, in longitudinal measurement models the errors of measurement corresponding to the same indicator *should be* allowed to co-vary over time (McArdle & Bell, 2000; Pitts et al., 1996) in order to account for the systematic (method) variance that is associated with each specific indicator.

Maximum likelihood estimation methods were used and the input for each analysis was the covariance matrix of the items. The goodness-of-fit of the different models was evaluated using the following absolute goodness-of-fit indices: (1) the χ^2 goodness-of-fit statistic, (2) the Root Mean Square Error of Approximation (RMSEA), (3) the Goodness of Fit Index (GFI) and (4) the Adjusted Goodness of Fit Index (AGFI). Moreover, three relative goodness-of-fit indices were calculated: (1) the Normed Fit Index (NFI), (2) the Comparative Fit Index (CFI), and (3) the Incremental Fit Index (IFI). So, by using different types of fit indices, we are also able to compare models to one another in order to determine which one fits best to our data. Values smaller than .08 for the RMSEA are indicative of an acceptable fit, and values greater than .10 should lead to model rejection (Cudeck & Browne, 1993). For all other fit indices, i.e. GFI, AGFI, NFI, CFI, and IFI, values greater than .95 are considered as indicating a good fit (Hu & Bentler, 1999; Yu, 2002).

RESULTS

The study sample included 315 women (84%) and 57 men (16%), working in 29 different Intensive Care Units. Nurses' mean age was 34,71 years (SD = 7,18) and their mean tenure in the present ICU was 6,24 years (SD = 4,61; Median = 5,17; range = 0,5 – 25,8 years.).

Means, standard deviations, internal consistencies (Cronbach's α), and intercorrelations of all study variables are reported in Table 1. All alpha values meet the criterion of .70 (Nunnally & Bernstein, 1994). Closer inspection of Table 1 reveals that efficacy beliefs are significantly,

positively related to the aspects of team commitment (attachment, identification, and involvement), and to the aspects of collaborative practice (open communication, cooperative problem solving, and professional recognition) at both T1 and T2. In the same way, the aspects of team commitment are positively correlated with the aspects of collaborative practice at both measurements.

INSERT TABLE 1 ABOUT HERE

Confirmatory Factor Analysis

The results of the Confirmatory Factor Analysis on Time 1 data show that our measurement model fits the data. At T1, all manifest variables loaded significantly on the intended latent factors, with factor loadings varying between .49 and .85. Even though the Chi-square value of the three-factor model is significant ($\chi^2=41.41$, $df=12$; $p < .001$), the relative fit indices were all meeting the criteria for a good fit: RMSEA=.08; GFI=.97; AGFI=.93; NFI=.96; CFI=.97; IFI=.97. Based on these results, professional efficacy was used as the only indicator of the latent construct 'efficacy beliefs'. Involvement; identification and emotional attachment were used as indicators of the latent construct 'team commitment'. Finally, open communication, cooperative problem solving and professional recognition were used as indicators of the latent construct 'collaborative practice'.

Testing the Reciprocal Model

As can be seen from Table 2, the model fit of the *Causality Model* (M2) is superior to that of the *Stability Model* (M1) ($\Delta\chi^2(3) = 56.18$, $p < .001$). This suggests the relevance of cross-lagged paths from T1 efficacy beliefs to T2 team commitment and T2 collaborative practice, as well as from T1 team commitment to T2 collaborative practice. Furthermore, the *Reversed Causality Model* (M3) also fitted the data significantly better than the *Stability*

Model (M1) ($\Delta\chi^2(3) = 60.76, p < .001$). This indicates that the model with the cross-lagged paths from T1 team commitment to T2 efficacy beliefs, and from T1 collaborative practice to T2 team commitment and T2 efficacy beliefs, also shows a better fit to the data than the model including only temporal stabilities and synchronous correlations (i.e., M1). Finally, it appeared that the *Reciprocal Model* (M4) with the addition of reciprocal effects was superior to the Stability Model M1 ($\Delta\chi^2(6) = 125.70, p < .001$), the Causality Model M2 ($\Delta\chi^2(3) = 69.52, p < .001$), and the Reversed Causality Model M3 ($\Delta\chi^2(3) = 64.94, p < .001$). So, both causal and reversed causal paths are important, as the model with cross-lagged reciprocal relationships between efficacy beliefs, team commitment, and collaborative practice (M4) best fits the data.

INSERT TABLE 2 ABOUT HERE

Hypothesis 1 assumed that team commitment mediates the relationship between efficacy beliefs and collaborative practice. Following Taris and Kompier (2006), a test for mediation in the present two-wave study requires that both the path from T1 efficacy beliefs to T2 team commitment and the path from T1 team commitment to T2 collaborative practice are significant. The model M2 that includes these causal relationships resulted in significant lagged and positive effects of T1 efficacy beliefs on T2 team commitment ($\beta = .34, p < .001$) as well as of T1 team commitment on T2 collaborative practice ($\beta = .25, p < .001$). However, the lagged effect of T1 efficacy beliefs on T2 collaborative practice is not significant. So, efficacy beliefs are positively related to team commitment, which in turn has a positive impact on collaborative practice. Thus, Hypothesis 1 is supported by the data of this study: over time, team commitment mediates the relationship between professional efficacy on the one hand and collaborative practice on the other hand.

According to *Hypothesis 2a*, T1 team commitment would have a lagged positive effect on T2 efficacy beliefs. The model M3 that included this path showed a significant reversed causal effect of T1 team commitment on T2 efficacy beliefs ($\beta=.26, p<.01$). So, our results confirm *Hypothesis 2a*, as levels of team commitment at T1 are significantly, positively related to nurses' efficacy beliefs at T2. In addition, a significant reversed causal effect of T1 collaborative practice on T2 team commitment was found ($\beta=.47, p<.001$). Thus, *Hypothesis 2b*, stating that T1 collaborative practice would have a lagged positive effect on T2 team commitment, is confirmed as well. Collaborative practice at T1 is significantly, positively related to team commitment at T2. Finally, a non-significant reversed causal effect was obtained of T1 collaborative practice on T2 efficacy beliefs.

So, both causal and reversed causal relationships exist simultaneously, which is confirmed by the results of model M4. The *Final Model* (M5), in which non significant path coefficients of M4 are excluded, is displayed in Figure 2.

INSERT FIGURE 2 ABOUT HERE

To summarize, these findings illustrate that team commitment plays a mediating role in the relationship between efficacy beliefs at T1 and collaborative practice at T2, and in the relationship between collaborative practice at T1 and efficacy beliefs at T2. That is, efficacy beliefs at T1 are significantly, positively related to team commitment at T2, whereas in turn team commitment at T1 is significantly, positively related to collaborative practice at T2. In addition, collaborative practice at T1 is significantly, positively related to team commitment at T2. Finally, team commitment at T1 is significantly, positively related to nurses' efficacy beliefs at T2.

DISCUSSION

The present longitudinal study among ICU nurses explored the way in which efficacy beliefs, team commitment, and collaborative practice are related to each other over time. The study variables were assessed in two measurement waves with a 15 months time lag in between. Next to testing the potential mediating role of team commitment in the relationship between efficacy beliefs and collaborative practice, this study specifically looked for reciprocal relationships between the focal variables. A clear limitation of our study is that data were obtained by means of self-report only and, consequently, the results may be contaminated by common method variance. However, the final model is in line with current theory and with results of previous empirical studies, and is therefore likely to offer a plausible picture of the relationships between the study variables.

First, the results of SEM analyses showed that team commitment indeed mediates the relationship between ICU nurses' professional efficacy and the quality of collaboration between nurses and physicians. Efficacy beliefs had a positive effect on team commitment over time, which in turn had a positive effect on collaborative practice over time. In other words, feeling efficacious leads to (affective) identification with the work group, which in turn fosters the quality of working relationships within the team. The positive relationship between efficacy beliefs (i.e., a resource) and commitment is consistent with the motivation process that is described by the Job Demands-Resources Model (Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner, & Schaufeli., 2001), and with the findings of Meyer et al. (2002) and Bayazit and Mannix (2003) that were described in the introduction. In the present study, ICU-nurses' commitment to their work team is 'fuelled' by their professional efficacy beliefs. In addition, this study demonstrates that this motivational process has a long-term, positive effect on desirable work behaviours – in terms of good collaboration - as well. Apparently, a strong affective bond with ones work team, which can also be considered a

social resource, leads ICU-nurses to ‘invest’ in the future quality of working relationships within the team.

Next, our results showed that collaborative practice is also positively related to feelings of professional efficacy over time. However, again, this relationship is not a direct one but it is mediated by team commitment. In other words, high quality working relationships within the team lead to a positive affective state (identification), which in turn boosts personal resources. The positive relationship between team commitment and efficacy beliefs is in line with Fredrickson’s (2001) Broaden-and-Build Theory of Positive Emotions. According to this theory, the experience of positive emotions broaden people’s momentary thought-action repertoires, which in turn serves to build their enduring personal resources such as efficacy beliefs.

To conclude, our results imply that neither of the constructs included in our research model can be considered as a single cause or consequence, as reciprocal causation – i.e. a combination of causation and reversed causation – seems to be at hand.

CONCLUSION

The present study corroborates previous findings (e.g., Llorens et al., 2007) on the motivational potential of efficacy beliefs in the work setting. Although efficacy beliefs are usually considered an outcome, the results of our study convincingly demonstrate that they can be considered a cause of psychosocial work processes as well. Moreover, this study provides clear evidence that efficacy beliefs, team commitment, and collaborative practice have reciprocal relationships over time. In addition, results point out the key role of team commitment as a mediator between efficacy beliefs and collaborative practice.

Practically speaking, our findings emphasize the importance of creating a work environment that is conducive to ICU nurses’ professional efficacy. This can, amongst others,

be achieved by providing nurses with sufficient task resources (e.g., job control) to perform their job well, which in turn increase the likelihood of so-called 'success experiences'. These experiences lead people to rely on their own competence, thereby experiencing higher levels of efficacy (Bandura, 1997), and as such they enable the positive processes that are described in this article to start off.

Future studies on (antecedents of) collaborative practice might also use more objective measures of the quality of working relationships (e.g., observations of number or frequency of conflicts between doctors and nurses) or team commitment (e.g., actual turnover rates). Next to individual efficacy beliefs, these studies might include collective efficacy beliefs, e.g. group potency (Guzzo, Yost, Campbell & Shea, 1993). Moreover, in order to be able to demonstrate the existence of so-called gain spirals of efficacy beliefs (cf. Lindsley, Brass & Thomas, 1995), three-wave panel studies that allow a more rigorous interpretation of causality and reciprocity should be performed (Salanova, Llorens, and Schaufeli, 2009). Finally, it would be interesting to see if the results of this study can be generalized to the functioning of multidisciplinary teams outside the health care setting.

FUNDING

This study was financially supported by the Commission of the European Communities (grant BMH4-CT96-0817), by the Foundation for Research on Intensive Care in Europe (FRICE), and by Bancaixa grant INV-2006-18

CONFLICTS OF INTEREST

No conflict of interest has been declared by the authors.

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Figure captions:

Figure 1: Hypothesized model

Figure 2: Structural path coefficients of the Final Model (n= 372)

Table 1

Means, Standard Deviations, Correlations, and Internal Consistencies (Cronbach's alpha; on the diagonal) of the Study Variables (n = 372)

	Mean	SD	F	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Efficacy beliefs T1	5.48	.97		.72													
2. Efficacy beliefs T2	5.29	.93		.49**	.73												
3. Involvement T1	3.78	.74		.34**	.24**	.79											
4. Involvement T2	3.72	.70		.21**	.32**	.53**	.82										
5. Identification T1	3.74	.79		.37**	.27**	.54**	.40**	.71									
6. Identification T2	3.72	.81		.27**	.39**	.35**	.58**	.49**	.70								
7. Attachment T1	3.96	.86		.19**	.08	.38**	.27**	.41**	.29**	.81							
8. Attachment T2	3.82	.91		.12*	.17**	.18**	.39**	.21**	.65**	.44**	.83						
9. Open communic T1	3.44	.73		.18**	.16**	.41**	.34**	.43**	.34**	.26**	.18**	.84					
10. Open communic T2	3.44	.76		.18**	.26**	.30**	.45**	.27**	.42**	.18**	.19**	.64**	.90				
11. Coop prob solving T1	3.28	.78		.31**	.19**	.46**	.34**	.39**	.30**	.24**	.11*	.67**	.51**	.76			
12. Coop prob solving T2	3.30	.75		.19*	.26**	.32**	.50**	.22**	.40**	.15**	.16**	.42**	.64**	.51**	.78		
13. Prof recognition T1	3.25	.76		.26**	.23**	.49**	.42**	.52**	.37**	.23**	.11*	.65**	.54**	.63**	.45**	.83	
14. Prof recognition T2	3.30	.71		.24**	.27**	.46**	.46**	.40**	.45**	.25**	.19**	.56**	.73**	.51**	.63**	.72**	.87

Note. ** $p < .01$; * $p < .05$; Coefficients alpha are reported on the diagonal

Table 2

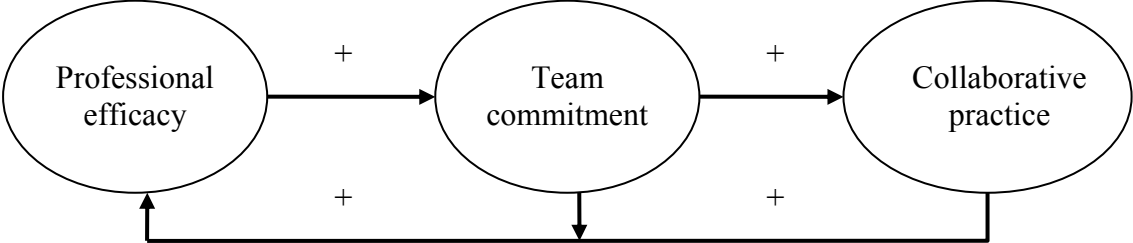
Goodness-of-fit index for the different Models in the SEM analyses (n = 372)

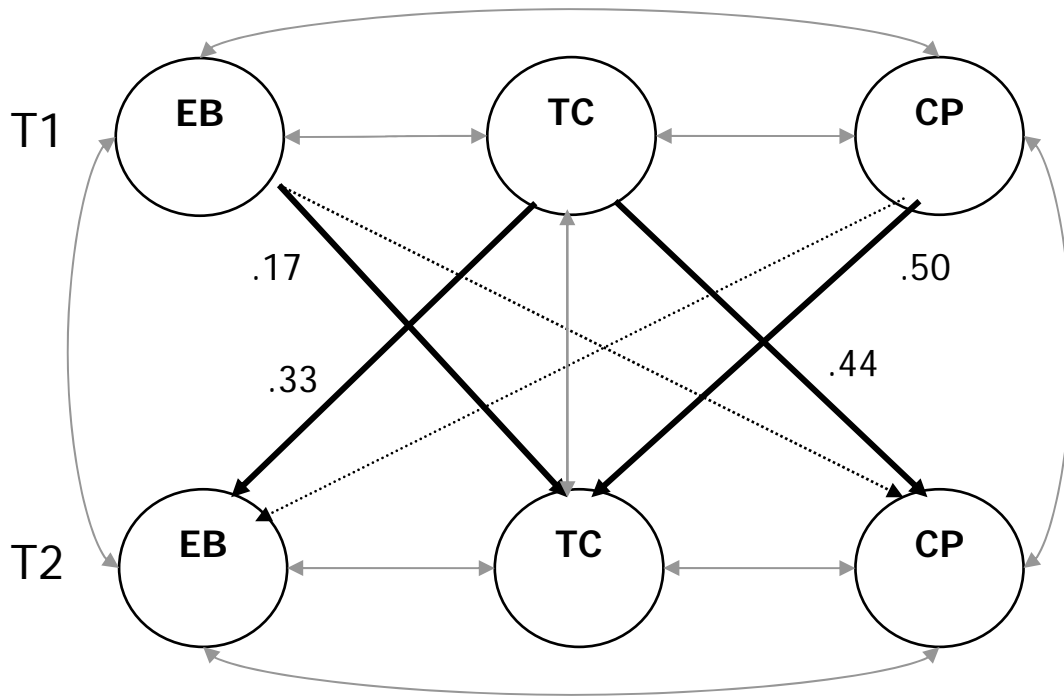
Model	χ^2	df	RMSEA	GFI	AGFI	NFI	CFI	IFI	$\Delta\chi^2$	Δdf
Model 1 Stability	269.72	72	.09	.91	.86	.90	.92	.93		
Model 2 Causality	213.53	69	.08	.93	.88	.92	.95	.95	M2-M1 = 56.18***	3
Model 3 Reversed	208.954	69	.07	.93	.88	.92	.95	.95	M3-M1 = 60.76***	3
Model 4 Reciprocal	144.014	66	.06	.95	.91	.95	.97	.97	M4-M1=125.70***	6
									M4-M2 = 69.52***	3
									M4-M3 = 64.94***	3
Model 5 Final	145.179	68	.05	.95	.91	.95	.97	.97	M5-M4 = 1.17 n.s.	2

Note. χ^2 = chi-square statistic; df = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; GFI = Goodness-of-Fit Index;

AGFI = Adjusted Goodness-of-Fit Index; NFI = Normed Fit Index; CFI = Comparative Fit Index; IFI = Incremental Fit Index; *** = p < .001;

n,s, = non significant.





Note. Solid lines represent standardized coefficients. All path coefficients are significant at $p < .01$. Dotted lines indicate non-significant paths.

EB = efficacy beliefs; TC = team commitment; CP = collaborative practice.