



ORIGINAL ARTICLE

A Prospective Study of Knowledge Sharing at Work Based on Self-Determination Theory

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Knowledge sharing involves the provision or receipt of information, know-how, best practices, lessons learned, and/or feedback about a task, product, and/or procedure in order to develop new skills and competencies at work which can improve individual, group, and/or organizational performances. Based on self-determination theory, the study partners hypothesized that people with more self-determined latent profiles will report more knowledge sharing at work over 18 months than people with less self-determined latent profiles. Participants were 299 dental hygienists who completed a national online survey at baseline and at 18 months. Results of a Latent Profile Analysis revealed that dental hygienists with the most self-determined profile (Profile 2) reported a higher level of knowledge sharing at work at 18 months than dental hygienists in: Profile 1, “the controlled profile,” characterized by perceptions of managerial control and relatively high levels of the control orientation—moderate effect size; Profile 3, “the helpless profile,” characterized by the impersonal orientation and an absence of the autonomy orientation—large effect size; and Profile 4, “the mixed profile,” characterized by both the highest levels of fear of failure and control orientation but also by high levels of autonomy orientation and perceived managerial autonomy support—moderate effect size. Applied implications, particularly around ways to maximize managerial autonomy support and minimize managerial control to promote well-being and performance and reduce ill-being and non-effective functioning, are discussed.

Keywords: Causality orientations at work; fear of failure at work; knowledge sharing; perceived managerial autonomy support; perceived managerial control

Introduction

Knowledge sharing is an employee behavior that involves the provision or receipt of information, know-how, best practices, lessons learned, and/or feedback about a task, product, and/or procedure in order to develop new skills and competencies at work (de Vries, van den Hooff, & de Ridder, 2006; Gagné, 2009; Swift & Virick, 2013). As such, knowledge sharing is of value to organizations (Grant, 1996; Renzl, 2008), as it can improve individual, group, and/or organizational performances (Argote, Ingram, Levine, & Moreland, 2000; Reinholt, Pedersen, & Foss, 2011; Wang & Noe, 2010). Among dental hygienists, knowledge sharing on tasks and procedures that are used for health promotion can occur at the individual, group, and population levels (Larsen, 2010). Broadly speaking, dental hygienists share knowledge and cooperate with

a variety of health care professionals (dentists, nurses, teachers, dietitians, psychologists, and medical doctors) around diagnosis, charting, treatment planning, and use of therapeutic methods to counsel patients regarding management of oral disease and motivation for behavior changes in order to implement best evidence-based practices (Halvari, Halvari, Bjørnebekk, & Deci, 2012; Sweeting, Davis, & Cobb, 2008). As well, knowledge sharing can occur around issues of time pressure, conflict between “out-door” and “chair-side” treatment, medical and odontological diagnosis, deciding when to observe versus when to treat dental caries (cavity), treatment of children and difficult and/or highly anxious patients, reporting of violence and sexual abuse, profit, and ethics. Although such knowledge sharing can be organized using meetings and seminars, about 80% of oral health care professionals share their knowledge and experiences via personal interactions (Ayers, Thomson, Newton, & Rich, 2008; Bretherton, Chapman, & Chipchase, 2016; Gorter, 2005).

In the organizational literature, previous research has shown that managerial support for employee goals and values is positively associated with knowledge sharing at work (Buch, Dysvik, Kuvaas, & Nerstad, 2015), whereas

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managerial control of employees is negatively associated with such behavior (Kim, Kim, & Yun, 2015). Also, individual differences among employees, as reflected by general causality orientations and fear of failure, have been related to knowledge sharing and other work-related outcomes in previous research (Deci & Ryan, 1985; Fang, 2017; Gagné, 2009; Haraldsen, Halvari, Solstad, Abrahamsen, & Nordin-Bates, 2019). Yet, to date, no study has examined simultaneously the combination of variables measuring employees' perceptions of their managers, individual differences in their causality orientations and fear of failure, and how they predict knowledge sharing. Also, there is a dearth of evidence on how these constructs are inter-related over an extended period of time, as most studies of knowledge sharing have been conducted either in cross-section or over fairly short periods of time (Stenius, Haukkala, Hankonen, & Ravaja, 2017). In the current study self-determination theory (SDT; Ryan & Deci, 2017) was used to guide a person-centered examination of knowledge sharing at work as it is predicted by combinations of employees' perceptions of their managers as autonomy supportive versus controlling, their causality orientations, and their fear of failure over 18 months—an amount of time between assessments expected to minimize the potential for common method bias (Podsakoff, MacKenzie, & Podsakoff, 2012). Hence, the focus of this study is how perceived managerial interpersonal styles, causality orientations, and fear of failure are combined in different profiles of dental hygienists to affect knowledge sharing at work.

Managerial autonomy support and control of employees

According to SDT, managerial autonomy support involves acknowledging employees' perspectives and feelings, offering relevant information and choice, emphasizing dialogue and participation in decision making, encouraging self-initiation and self-direction, and providing informational performance-relevant feedback (Niemiec & Spence, 2017). Managerial control, by contrast, involves pressure and coercion of employees. For instance, controlling managers impose their own thoughts and solutions without listening to employees' opinions (thereby devaluing their feelings and perspectives), provide negative feedback "in public" in order to humiliate employees, and use language such as "should," "must," "ought to," or "have to" think, feel, or behave in particular ways. Also, controlling managers tend to rely on tangible rewards, pressure, competition, and other coercive tactics in order to enforce compliance from employees (Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015). In sum, an autonomy-supportive managerial style is encouraging of employees whereas a controlling style is pressuring and manipulative.

Previous research has shown that knowledge sharing among employees is positively associated with managerial behaviors that closely resemble autonomy support, such as caring about employees' opinions, values, goals, and well-being (Buch et al., 2015). Other research has shown that knowledge sharing among employees is positively associated with managerial support and affect-based

trust, along with their being (a) sincere in understanding employees' points of view, (b) benevolent, (c) competent, (d) fair, (e) honest, and (f) predictable (Chae, Park, & Choi, 2019; Mayer, Davis, & Schoorman, 1995; Renzl, 2008). Finally, other research has shown that knowledge sharing among employees is positively associated with an organizational culture that demonstrates care for relationships through a focus on teamwork, consensus, and participation, as well as a top-management presence that shows care and offers assistance during knowledge sharing implementation (Lee, Shiue, & Chen, 2016).

To the author's knowledge, only one study has examined knowledge sharing among employees as it relates to managerial control (Kim et al., 2015), which showed that abusive supervision is negatively associated with knowledge sharing. Such supervision is comparable to managerial control of employees, and involves managers not acknowledging their employees' thoughts, feelings, and behaviors; criticizing employees in front of others; and signaling that employees are incompetent. Although abused employees tend not to share their knowledge with others, organizational support that takes the forms of care, assistance, and acknowledgement of goals and values can mitigate this inverse association (Kim et al., 2015). Hence, this is the only study in this literature review indicating that organizational autonomy support may serve as a buffer in reducing the negative relation between controlling management and knowledge sharing.

According to SDT, the psychological mechanisms that explain the relations of these managerial styles to knowledge sharing among employees are satisfaction and frustration of employees' basic psychological needs for autonomy (an experience of volition and choice), competence (an experience of capability and effectiveness), and relatedness (an experience of mutual care and concern vis-à-vis others). Managerial autonomy support is expected to yield satisfaction of these needs and, ultimately, promote psychological growth and well-being. In contrast, managerial control is expected to yield frustration of these needs, which can produce malfunctioning and ill-being (Vansteenkiste & Ryan, 2013). Hence, an autonomy-supportive managerial style can help build a more effective organization through its positive influence on employees' well-being and performance (Baard, Deci, & Ryan, 2004; Deci, Olafsen, & Ryan, 2017; Paauwe, 2009; Stenius et al., 2017). Yet SDT posits that individual differences among employees, as reflected by causality orientations, can also affect work-related outcomes (Ryan & Deci, 2017). However, no study has examined how possible combinations of managerial styles, causality orientations, and fear of failure among employees might be related to knowledge sharing. Thus, attention now turns to how causality orientations might interplay with managerial styles and fear of failure in different person-oriented profiles to affect knowledge sharing at work.

Causality orientations

According to SDT, general causality orientations reflect stable individual differences in motivation that influence thoughts, feelings, and behaviors over time (Deci & Ryan,

1985). As discussed by Ryan and Deci (2017), individuals with a strong autonomy orientation tend to ascribe an informational functional significance to contexts and observe possibilities for self-determination and choice. In contrast, individuals with a strong controlled orientation tend to ascribe a controlling functional significance to contexts and perceive external contingencies and social pressures. Individuals with a strong impersonal orientation tend to ascribe an amotivating functional significance to contexts and view the environment as uncontrollable and replete with obstacles. As such, autonomy-oriented individuals are likely to take interest in personal and social-contextual experiences, create possibilities for choice in accord with their own personality, interpret external events as informational, and experience autonomous motivation in action. In contrast, control-oriented individuals are likely to lose sight of their values, goals, and interests in order to comply with (or defy against) ambient social pressures. Finally, impersonal-oriented individuals are likely to experience incompetence, passivity, and a lack of intentionality.

Previous research has shown that (a) the autonomy orientation is positively associated with perceptions of managerial autonomy support, and it is negatively associated with fear of failure (Deci & Ryan, 1985); (b) the control orientation is positively associated with not only perceptions of managerial control but also fear of failure (Haraldsen et al., 2019); and (c) the impersonal orientation is positively associated with fear of failure (Deci & Ryan, 1985). The literature on the associations between general causality orientations and knowledge sharing is scarce. Yet previous research has shown that the autonomy orientation is positively associated with constructs that are similar to knowledge sharing, including job involvement and helping others (Liu & Fu, 2011). Also, among teachers the autonomy orientation has been shown to predict positive changes in pedagogy, such as giving autonomy support, time, and attention to students; being actively involved; and helping students structure the content of their learning. In contrast, the control orientation has been shown to predict a more controlling pedagogical style over time (Reeve, Jang, & Jang, 2018). Finally, among medical students the autonomy orientation has been shown to predict the use of psychosocial beliefs in interviewing patients whereas the impersonal orientation was negatively associated with such use. Moreover, the autonomy orientation has been shown to predict the encouragement of self-initiation and the provision of competence-relevant information to patients over six months whereas the control orientation was negatively associated with such behaviors (Williams & Deci, 1996).

According to SDT, the general causality orientations are developmental outcomes that result from chronic exposure to social environments that are perceived to be need supportive (yielding need satisfaction) versus need thwarting (yielding need frustration), which in turn affect ongoing motivation and psychological experience (Deci & Ryan, 1985; Ryan & Deci, 2017). Yet of most importance to the current study, causality orientations that are assessed at the contextual level (e.g., in the work domain) are more amenable to change than at the global personality

level (Deci & Ryan, 1985; Rose, Markland, & Parfitt, 2001; Vallerand, 1997).

Based on the literature review, so far it is reasonable to expect profiles of dental hygienists with high perceived autonomy support and high autonomy orientation to predict higher levels of knowledge sharing compared to profiles containing dental hygienists with perceived higher levels of control and impersonal orientations and controlling management. In the next section, attention turns to the concept of fear of failure at work as it might combine with perceived managerial styles and causality orientations in different profiles to predict knowledge sharing.

Fear of failure at work

In the work domain, fear of failure involves employees' preoccupations with fears and self-doubts about being viewed by others as incompetent (De Castella, Byrne, & Covington, 2013). Interestingly, among elite dancers, classical musicians, and athletes, fear of failure has been shown to be positively related to perceptions of control from their teachers and coaches (Haraldsen et al., 2019). Indeed, fear of failure has been shown to be positively related to a variety of controlling interpersonal styles, such as pressure from coaches (Sagar & Stoeber, 2009), authoritarian parenting (Gong, Fletcher, & Bolin, 2015), and love withdrawal (Elliot & Thrash, 2004). More broadly, Carver (2004) noted that fear, in general, is a function of cues in one's environment that are perceived as controlling, punitive, and frustrating.

Previous research has shown that constructs which are similar to fear of failure, such as fears of losing power and face, are negatively associated with knowledge sharing (Fang, 2017; Hsu & Chang, 2014; Park & Gabbard, 2018; Renzl, 2008), and are positively associated with knowledge hiding and loafing (Fang, 2017). Similarly, worry about not performing well has been linked to less help seeking (Roussel, Elliot, & Feltman, 2011) and more help avoidance (Inbar-Furst & Gumpel, 2015) in an academic context. In this way, the predicted inverse association between fear of failure at work and knowledge sharing can have important implications for individual, group, and/or organizational performances.

Within the SDT tradition, fear of failure has been shown to be negatively related to the autonomy orientation and positively related to the impersonal orientation and managerial control (Deci & Ryan, 1985; Haraldsen et al., 2019). Similarly, and with regard to oral health care, the control orientation in patients has been shown to be positively related to their fear of treatment (Halvari, Halvari, Deci, & Williams, 2020). This suggests, therefore, that fear of failure at work is likely to be positively associated with perceptions of managerial control, the control orientation, and the impersonal orientation, but negatively associated with the autonomy orientation. In this research, the correlations of fear of failure with causality orientations and managerial styles have typically been from .20 to .40. Dependent of other active variables, employees with high fear of failure may cope with such fear by demonstrating their competence. Yet conversely, these employees might also avoid knowledge sharing

in order to mitigate their fear arousal (De Castella et al., 2013; Elliot & Church, 1997). Hence, fear of failure is theoretically expected to be combined with competence-related and control-related causality orientations, as reflected in feelings of lack of competence (viz., impersonal orientation) and high control (viz., control orientation). Other research does also indicate that fear of failure can be both motivating and inhibiting by interacting with social-contextual attributes of important others, such as managerial autonomy support and controllingness, in prediction of behavioral outcomes (de Souza & Tomei, 2016; Cacciotti, Hayton, Mitchell, & Giazitzoglu, 2016). In addition, person-centered approaches have pointed to profiles of high intrinsic and high extrinsic motivations (as reflected by causality orientations in the present study), and high fear of failure in prediction of research motivation (Smith, Deemer, Thoman, & Zazworsky, 2014). Consequently, an interesting question is how fear of failure is combined with causality orientations and perceived managerial styles in forming person-centered profiles among dental hygienists.

Research Questions and Hypotheses

The current study used a person-centered approach to identify latent profiles that are based on dental hygienists' perceptions of their managers as autonomy supportive versus controlling, causality orientations, and fear of failure. Then, membership in the latent profiles at baseline was used to predict dental hygienists' knowledge sharing at work over 18 months. Based on the literature reviewed, it was hypothesized that more self-determined latent profiles (viz., higher levels of perceived managerial autonomy support and autonomy orientation, lower levels of fear of failure) will report more knowledge sharing at work over 18 months than less self-determined latent profiles.

Method

Participants and procedure

The population of interest in the current study were the 999 members of The Norwegian Dental Hygienist Federation, of whom, 299 provided informed consent to complete the online survey at baseline (March 2017) and 180 completed the study at 18 months (September 2018). Ethical approval was obtained from the Norwegian Center for Research Data (Project #53264) prior to data collection. A large percentage of participants were female (98%) between 22 and 66 years old [$M(SD) = 42.71 (12.62)$ years] with a dental hygiene education corresponding to a bachelor's degree (91.9%). A majority of participants had a full-time position (93.9%), an average tenure as a dental hygienist of 23 years ($SD = 9.62$), worked daytime hours (95.3%), and in public dental clinics (65.7%).

The following procedural remedies were used to minimize common method bias (see Podsakoff et al., 2012): (1) A survey with work-relevant questions was developed to maximize participants' motivation to respond accurately; (2) thorough information about the aims of the study, along with validated instructions and measures, were delivered to participants; and (3) a time separation of 18 months between assessments was

built into the study, as based on the assumption that the associations among measures are relatively stable over time and common method bias will dissipate over time.

Measures

All measures were translated into Norwegian and then back-translated into English using the approach recommended by Beaton, Bombardier, Guillemin, and Ferraz (2000), with the exceptions of Causality Orientations at Work and Fear of Failure, which were developed in Norway.

Managerial autonomy support

The Work Climate Questionnaire (Baard et al., 2004) assessed employees' perceptions of autonomy support received from their manager (6 items; e.g., "I feel that my manager provides me with choices and options"). Responses were made on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree). The reliability for this measure was $\alpha = .94$.

Managerial control

Using a procedure that is similar to Haerens et al. (2015), seven items from the Psychologically Controlling Teaching Scale (Soenens, Sierens, Vansteenkiste, Dochy, & Goossens, 2012) and two items from the Teacher as a Social Context Questionnaire (Belmont, Skinner, Wellborn, & Connell, 1988) were modified to reflect the work context. These items, along with three newly developed items (e.g., "My manager often criticizes me for how I do my job") assessed employees' perceptions of control received from their manager. Responses were made on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree). The reliability for this measure was $\alpha = .96$.

Causality orientations at work

The Work Causality Orientations Scale (Halvari & Olafsen, 2020) presented participants with six hypothetical scenarios (e.g., "Imagine that your manager has the desire for you to become more self-driven and independent in your job. The first thing you think will probably be..."). Participants then rated preselected responses that assessed the autonomy orientation (e.g., "This will be important for me to try to see if it gives results"), the control orientation (e.g., "Feel the pressure to do as my manager says"), and the impersonal orientation (e.g., "It is hard to do something about things like independence; I am who I am"). Responses were made on a 7-point scale from 1 (very unlikely) to 7 (very likely). The reliability for the autonomy orientation was $\alpha = .80$. The reliability for the control orientation was $\alpha = .87$. The reliability for the impersonal orientation was $\alpha = .76$.

Fear of failure at work

The fear of failure subscale of the Achievement Motives Scale (Gjesme & Nygård, 1970) was modified to reflect the work context and assessed fear of failure at work (15 items; e.g., "I don't like situations *at work* where my abilities are tested"). Responses were made on a 4-point scale from 1 (not at all true of me) to 4 (very true of me). The reliability for this measure was $\alpha = .95$.

Knowledge sharing

The organizational communications (4 items; e.g., “At work, I propose problem-solving suggestions in team meetings) and personal interactions (3 items; e.g., “At work, I spend time in personal conversation [e.g., discussion in hallway, over lunch, through telephone] with others to help them with their work-related problems) subscales of the Knowledge Sharing Behavior Scale (Yi, 2009) assessed knowledge sharing. Responses were made on a 7-point scale from 1 (never) to 7 (always). The reliability for organizational communications was $\alpha = .92$. The reliability for personal interactions was $\alpha = .85$.

Demographic characteristics

Participants indicated their gender and age (in years), highest level of education completed, percentage of time worked (used to determine full-time versus part-time status), tenure (in years), day versus evening work hours, and public versus private work setting.

Data Analysis

A Latent Profile Analysis (LPA) was conducted using the MLR estimator in Mplus 8.4 (Muthén & Muthén, 1998–2020) to identify latent profiles based on the measures at baseline (Time 1). In LPA, profile membership is “an unobserved categorical variable, where its value indicates which profile an individual belongs to with a certain degree of probability” (Spurk, Hirschi, Wang, Valero, & Kauffeld, 2020, p.2). The LPA was performed based on manifest variables, and all reliability estimates exceeded the recommended cutoff of .70, as defined by Nunnally (1979). In LPA, a series of solutions with different numbers of subgroups are tested to determine the optimal number of subgroups. In the current study, solutions were run until one was found in which a subgroup contained less than 25 participants, as recommended by Lubke and Neale (2006) as indicative of accurate sample size for correct model detection under large separation conditions. 100 random starts were used, with 20 starts retained for the final solution, which was replicated with 1500 random start values (see Geiser, 2012).

Several indices of model fit—along with expert opinion—were used to determine the optimal solution for the data (Nylund, Asparouhov, & Muthén, 2007). Specifically, and based on the log likelihood function, the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and sample-size adjusted BIC were inspected and compared across solutions. For each of the indices, a lower value indicates better fit to the data (Henson, Reise, & Kim, 2007; Shibata, 1976; Yang, 2006). The entropy value was inspected to evaluate the accuracy of the classification, and a value close to 1 indicates high accuracy in classification (Berlin, Williams, & Parra, 2014). Two likelihood ratio tests from Lo, Mendell, and Rubin (2001) and Nylund et al. (2007) were used to determine whether the current solution had a statistically better fit ($p < .05$) to the data than the previous solution. Solutions were evaluated based on their level of theoretical meaningfulness as well. Missing data were handled with Full Information Maximum Likelihood (FIML).

The three-step BCH approach (Asparouhov & Muthén, 2014) was used to examine the hypothesis that more self-determined latent profiles will report more knowledge sharing at work over 18 months than less self-determined latent profiles. In this approach, the outcome variable is treated as a continuous distal outcome, and then an overall test of association that is accompanied by pairwise profile comparisons is conducted for each outcome variable. A p value less than .05 was used to indicate statistical significance, and Cohen’s d was calculated for all pairwise comparisons as a measure of effect size.

Results

Missing data analysis

In the current study, 299 participants provided data at baseline (Time 1) and 180 of the participants (60.2%) provided data at 18 months (Time 2). Hence, 119 participants (39.8%) dropped out of the study. Assuming the possibility that a missing not at random (MNAR) mechanism could be evident in the data (see Enders, 2010), two recommended missing data analyses were conducted. First, Little’s missing completely at random (MCAR) test on the two knowledge sharing subscales (viz., organizational communications and personal interactions) were performed by comparing participants who provided data at both time points to those who provided data at only one time point [for “completers”: $\chi^2(18) = 9.97, p = .933$; $\chi^2(18) = 29.43, p = .043$; $\chi^2(124) = 122.50, p = .521$; for “dropouts”: $\chi^2(12) = 20.39, p = .060$; $\chi^2(41) = 40.71, p = .483$; $\chi^2(84) = 83.69, p = .489$]. Second, independent-samples t -tests—to determine if there were significant differences between “completers” and “dropouts”—were performed. The bootstrap results based on 10,000 resamples revealed no baseline differences in organizational communications [$t(215) = -0.34, p = .733$; 95% BC CI: $\{-0.299 - 0.210\}$; $d = .06$] or personal interactions [$t(231) = 0.14, p = .886$; 95% BC CI: $\{-0.203 - 0.234\}$; $d = .02$]. These analyses indicated that missing data were missing at random (MAR).

Descriptive statistics and correlations

Table 1 presents means, standard deviations, and intercorrelations for the study variables. As shown, organizational communications had significant correlation (and in the expected direction) with all motivation-relevant variables at baseline. Personal interactions had significant correlation (and in the expected direction) with motivation-relevant variables at baseline except managerial control and the control orientation. Age had a negative correlation with fear of failure, a positive correlation with organizational communications, and a negative correlation with work setting ($r = -.30, p < .001$) such that younger hygienists worked in private dental clinics.

Hypothesis testing: Latent Profile Analysis (LPA)

The LPA yielded a 4-profile solution that had both the best fit to the data and the most meaningful interpretation (see **Table 2**). As shown in **Table 3**, the proportions that reflected the most likely percentage of membership in Profiles 1–4 were 15.7%, 41.8%, 15.4%, and 27.1%,

Table 1: Means (*M*) and Standard Deviations (*SD*), as Well as Pearson Correlations¹ Between Predictor Variables (1–6) at Baseline and Knowledge Sharing Behavior after 18 Months (Variables 7–8), and Background Variables (9–10). Reliability, Cronbach α , in the Diagonal.

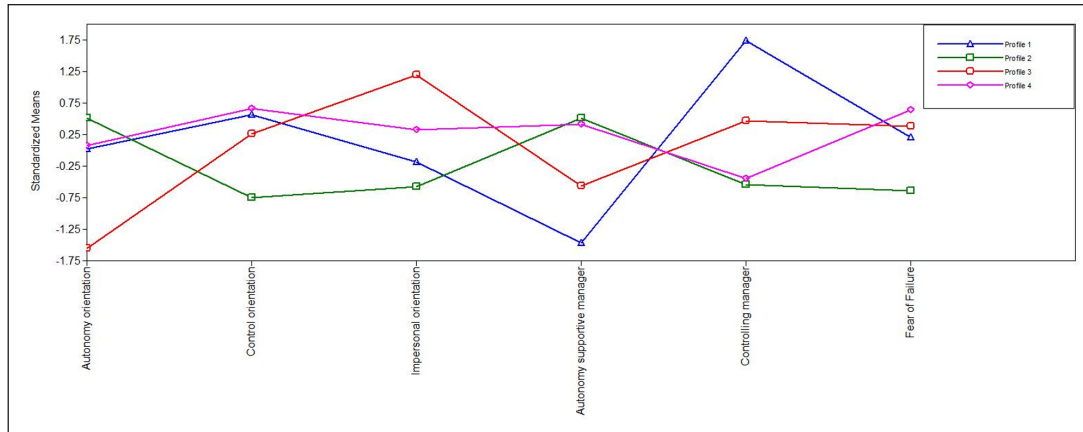
Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	<i>M</i>	<i>SD</i>
1. Autonomy support, manager (baseline)	.94	-.74**	.26***	-.25***	-.15**	-.19**	.14*	.17*	-.02	.01	5.48	1.37
2. Controlling style, manager (baseline)		.96	-.24***	.28***	.12*	.17**	-.02	-.15*	-.05	.04	2.21	1.34
3. Autonomy orientation, DH (baseline)			.80	-.18**	-.58***	-.25***	.25***	.20***	-.14	.05	6.20	0.82
4. Control orientation, DH (baseline)				.87	.36***	.48***	-.05	-.23***	-.05	-.03	3.60	1.54
5. Impersonal orientation, DH (baseline)					.76	.36***	-.19**	-.26***	.08	.02	1.95	0.94
6. Fear of failure at work, DH (baseline)						.95	-.35***	-.36***	-.19**	-.06	1.94	0.63
7. Knowledge sharing PI, DH (18 months)							.85	.71***	-.09	-.04	4.12	1.14
8. Knowledge sharing OC, DH (18 months)								.92	.15*	.05	5.00	1.10
9. Age (baseline)									—	-.08	42.71	12.62
10. Education ² (baseline)										—	3.95	0.32

Note: ¹ $p < .05$, ^{**} $p < .01$, ^{***} $p < .001$; $N = 299$ (M+ FIML analysis). Two-tailed tests of significance. DH = dental hygienist. OC = Organizational Communications. PI = Personal Interactions. Skewness values were all between -2.0 and 2.0 . Test-retest intercorrelations over 18 months were for autonomy support (.53), controlling style (.66), autonomy orientation (.51), control orientation (.65), impersonal orientation (.68), fear of failure (.76), and knowledge sharing (.74).

Table 2: Fit Indices, Entropy, and Model Comparisons for Estimated Latent Profile Analyses Models.

Model	AIC	BIC	SSA-BIC	Entr	LMR	BLRT
2 Profile	4975.75	5046.06	4985.80	0.88	<.001	<.001
3 Profile	4823.72	4919.93	4837.47	0.86	.10	<.001
4 Profile	4748.77	4870.89	4766.23	0.81	.10	<.001
5 Profile	4694.65	4842.66	4715.81	0.93	.56	<.001

Note: AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; SSA-BIC = Sample Size Adjusted Bayesian Information Criterion; LMR = p -value for Adjusted Lo-Mendell-Rubin likelihood ratio test; BLRT = p -value for bootstrap likelihood ratio test.

**Figure 1:** Standardized Means for Variables in Profiles 1–4 Based on the Latent Profile Analysis.

respectively. The controlled Profile 1 was characterized by dental hygienists having the highest level of managerial control as well as relatively high levels of both the autonomy and control orientations. The self-determined Profile 2 was characterized by employees having the highest level of managerial autonomy support, the lowest level of managerial control, the highest level of the autonomy orientation, the lowest levels of the control and impersonal orientations, and the lowest level of fear of failure. The helpless Profile 3 was characterized by hygienists having the highest level of the impersonal orientation and the lowest level of the autonomy orientation. The mixed Profile 4 was characterized by dental hygienists having the highest level of the control orientation and fear of failure, however, this profile also yielded exceptionally high levels of autonomy orientation and perceived autonomy support. Standardized mean scores are illustrated in **Figure 1**. In most cases, the effect sizes that distinguished the latent profiles were large in magnitude (Cohen, 1992).

Next, these four latent profiles were used to predict knowledge sharing, as represented by organizational communications and personal interactions, at 18 months. In support of this study's hypothesis, dental hygienists in Profile 2 (the most self-determined profile) reported higher levels of organizational communications and personal interactions than those in Profiles 1, 3, and 4. As shown in **Table 3**, the effect sizes for these differences were medium to large in magnitude.

Discussion

To the author's knowledge, the current study is the first to examine the associations between unique motivation profiles (derived from managerial styles, causality orientations, and fear of failure) and knowledge sharing at work. Findings from a sample of dental hygienists revealed four latent profiles at baseline that differed in their amounts of self-determination. Profile 2, to which 41.8% of the sample belonged, was the most self-determined profile, whereas the controlled Profile 1 (15.7% of participants) was characterized by perceptions of managerial control and relatively high levels of the autonomy and control orientations, the helpless Profile 3 (15.4% of participants) was characterized by the impersonal orientation and an absence of the autonomy orientation, and the mixed Profile 4 (27.1% of participants) was characterized by both the highest control orientation and the highest fear of failure, but also by exceptionally high autonomy orientation and autonomy support. Based on previous theory and research (Buch et al., 2015; Gagné, 2009; Haraldsen et al., 2019; Kim et al., 2015; Reeve et al., 2018; Renzl, 2008; Ryan & Deci, 2017; Stenius et al., 2017), and in line with author's hypothesis, findings also revealed that dental hygienists in the self-determined Profile 2 reported a higher level of knowledge sharing at work at 18 months than dental hygienists in Profile 1 (moderate effect size), in Profile 3 (large effect size), and in Profile 4 (moderate effect size).

Table 3: Mean Values and Standard Deviations for Study Variables in the Four Profiles and Outcomes.

	Effect size, <i>d</i>								
	Profile 1	Profile 2	Profile 3	Profile 4					
	Controlled (15.7% N = 47)	Self-determined (41.8% N = 125)	Helpless (15.4% N = 46)	Mixed (27.1% N = 81)					
	M (SD)	M (SD)	M (SD)	M (SD)					
Predictor variables (BL)			P1 vs. P2	P1 vs. P3					
Autonomy Orientation	6.22 (0.79)	6.63 (0.42)	4.92 (0.77)	6.24 (0.55)	-0.75 1.67	P1 vs. P4	P2 vs. P3	P2 vs. P4	P3 vs. P4
Controlling Orientation	4.49 (1.55)	2.43 (1.10)	3.95 (1.01)	4.70 (1.06)	1.66 0.41	-0.17	-1.41	-2.09	-0.72
Impersonal Orientation	1.77 (0.71)	1.39 (0.48)	3.03 (0.85)	2.31 (0.94)	0.69 -1.62	-0.64	-2.72	-1.33	0.79
Autonomy support, manager	3.44 (1.25)	6.16 (0.85)	4.67 (1.05)	6.10 (0.77)	-2.79 -1.07	-2.75	1.64	0.07	-1.63
Controlling manager	4.61 (0.94)	1.48 (0.57)	2.88 (0.91)	1.58 (0.60)	4.57 1.17	4.10	-2.08	-0.18	1.79
Fear of failure	2.07 (0.65)	1.51 (0.39)	2.19 (0.56)	2.39 (0.56)	-0.19 -0.44	-0.54	-1.52	-1.89	-0.36
Outcome variables (18 months)					X² (p-value)	Effect size <i>d</i>			
Knowledge sharing: organization communications	4.96 (1.27)	5.38 (1.05)	4.53 (0.72)	4.74 (1.11)	2.77 (<.05)	2.38 (.06)	22.29 (<.001)	10.09 (<.001)	0.44 (.26)
Knowledge sharing: personal interactions	4.00 (1.33)	4.51 (1.09)	3.53 (0.69)	3.90 (1.13)	3.53 (<.03)	0.41 0.40	0.88 0.94	0.60 0.56	-0.21 -0.32

Note: One-tailed tests of significance. BL = Baseline.

Taken together, these results suggest that the combinations of managerial style, causality orientations, and fear of failure contribute to knowledge sharing at work. From the perspective of SDT, factors such as managerial autonomy support and the autonomy orientation are likely to facilitate the satisfaction of basic psychological needs. In contrast, factors such as managerial control, the control and impersonal orientations, and fear of failure are likely to promote the frustration of basic psychological needs (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Halvari & Olafsen, 2020). In turn, need satisfaction and need frustration are expected to yield adaptive and maladaptive outcomes, respectively (Bartholomew et al., 2011). In these ways, managerial autonomy support and self-determination among employees can contribute to the adoption and internalization of organizational values and behaviors such as knowledge sharing, which is desired in most work environments (Deci et al., 2017; Ryan & Deci, 2017; Stenius et al., 2017).

Previous research has shown that managerial control, the control orientation, and need frustration are positively associated with fear of failure (Halvari et al., 2020; Haraldsen et al., 2019), as such factors are likely to undermine employees' self-determination (Ryan & Deci, 2017). Amid these findings, the three profiles which perform knowledge sharing at the lowest levels are explained differently. The helpless Profile 3 represents dental hygienists who report the highest level of the impersonal orientation, but also relatively high levels of managerial control and fear of failure, and the lowest level of the autonomy orientation. This profile contains person and contextual constructs which are supposed to reciprocally influence each other in the undermining process of self-determination resulting in low knowledge sharing (Ryan & Deci, 2017). When social settings such as meetings, workshops, and conferences are formal, official, or otherwise important (thereby becoming achievement settings), these individuals might experience fear of failure and associated shame that can impede performance (Elliot & Thrash, 2004). To be sure, these findings, which suggest that the impersonal orientation and fear of failure yield low levels of knowledge sharing, might have a broader array of negative consequences as fear of failure has been shown to predict more self-handicapping, defensive pessimism, helplessness, disengagement, and less achievement (De Castella et al., 2013).

The controlled Profile 1, containing dental hygienists with the highest level of perceived managerial control, a high control orientation, and the lowest perceived autonomy support, is representative for the dark side of motivational functioning according to SDT (Ryan & Deci, 2017). The combination of high control orientation and high perceived managerial control represent a person – environmental fit which reciprocally strengthen and influence each other (in both directions) which should undermine perceived environmental autonomy, which in turn predicts low levels of knowledge sharing. This profile also contains hygienists with relatively high autonomy orientation which, in relation to a high control orientation, may represent the potential for a within

– person conflict and, in relation to high managerial controllingness, may represent the potential for a person – management conflict, both undermining autonomy and knowledge sharing (Ryan & Deci, 2017). Such conflicts are further discussed below.

The most interesting profile is, perhaps, the mixed Profile 4 which yields the same low knowledge sharing as the controlled Profile 1 and the helpless Profile 3. This mixed profile contains 27.1% of the dental hygienists, and large effect sizes document its difference compared to all three other profiles (see **Table 3**). This profile and its outcome compared with other profiles are suggested to be interpreted by both within – person and person – management conflicts. This is illustrated by negative and positive within – person forces in the profile represented by the highest fear of failure and controlled orientation, and a simultaneously high autonomy causality orientation. That is, they feel highly interested in their work, but at the same time, they feel controlled by the environment and are preoccupied with fears, nervousness, worry, and self-doubts about being viewed by others as incompetent. In addition, when the person with this conflicting constellation of causality orientations and fear of failure experiences high levels of autonomy support (as also illustrated by Profile 4), work outcomes may suffer. To illustrate, even if they display autonomous values and goal systems internalized because of their relatively high autonomy causality orientation, they may feel unable to use the system to reach desired goals due to their high controlled causality orientation and high fear of failure. A dental manager using an autonomy-supportive approach may feel unfamiliar to these dental hygienists, because autonomy support may not provide structure, leaving them feeling abandoned and, thus, causing the dental hygienists to feel a sense of conflict and anxiety. Offering options of choice might be experienced as anxiety provoking, not as helping them to choose, because of a conflict between interest and feelings of competence self-doubts. Hence, high fear of failure and controlled orientation may interfere negatively with high work interests embedded in autonomy orientation. In turn, based on this conflict, they may experience a higher cognitive conflict, act defensively to autonomy-supportive information, and might not assimilate the autonomy-supportive information into their existing ways of thinking because they worry about being seen by the environment as incompetent (Su & Reeve, 2011; Hodgins & Knee, 2002). Thus, despite managers' use of time giving autonomy support for this group of dental hygienists, their knowledge sharing is at a low level. Therefore, future research aimed to intervene more directly in reducing fear of failure for this group of employees should be welcomed, which might increase their knowledge sharing. The experiences described by this large group of dental hygienists under study, take place in a hierarchical organizational culture with dentists and professors in most manager positions. In such a context, dental hygienists may be vulnerable for perfectionistic desires to reach very high standards of work performance accompanied by overly self-critical evaluations, characterized by combinations of fear of failure, doubts about actions, and fear of negative social

evaluation, regardless of achievements (Haraldsen et al., 2019). Hence, the present study should be followed up with a focus on perfectionism constructs in hierarchical manager structures, in addition to managerial styles, causality orientations, and fear of failure, in order to better understand knowledge sharing at work.

It is important to consider the ease with which managerial styles, causality orientations at work, fear of failure, and knowledge sharing can change over time. Although sparse data are published on this issue in the work domain, in the current study the test-retest correlations indicated that these constructs were stable over 18 months, which justified separating the measures over time (Podsakoff et al., 2012). In addition, the test-retest correlations over 18 months were substantially lower than their reliability coefficients, suggesting that the changes that occurred over 18 months reduced the ability of predictor variables to explain knowledge sharing due to the assumption that the relatively stable and true association between measures was retained at 18 months and that method bias (i.e., error variance) had dissipated (Podsakoff et al., 2012).

Applied implications

The results of the current study indicate that dental hygienists with the most self-determined profile (Profile 2) reported the highest level of managerial autonomy support, the lowest level of managerial control, the highest level of the autonomy orientation, the lowest levels of the control and impersonal orientations, the lowest level of fear of failure, and the highest level of knowledge sharing. From the perspective of SDT, managerial styles are key drivers of knowledge sharing at work. To be sure, managerial autonomy support can satisfy employees' basic psychological needs and promote an effective organization through the facilitation of employees' well-being and performance (Baard et al., 2004; Deci et al., 2017; Paauwe, 2009; Stenius et al., 2017). To be need supportive, managers can offer information and choice (support for autonomy), give positive performance feedback (support for competence), and relate to employees in a warm and caring way (support for relatedness). In contrast, need thwarting can be operationalized as use of intimidating language, demands without meaningful rationales, and excessive control (thwarting of autonomy); emphasis on faults, incompetence, and low likelihood to improve (thwarting of competence); and exclusion and refusal to be available for employees who are in need (thwarting of relatedness) (Rocchi, Pelletier, Cheung, Baxter, & Beaudry, 2017).

Hence, it is important to consider ways to maximize managerial autonomy support and minimize managerial control to promote well-being and performance and reduce ill-being and non-effective functioning (Vansteenkiste & Ryan, 2013). First, managers' *autonomy support* can be enhanced by affording employees responsibility and opportunity for decision making at work, which can be fueled by careful consideration of job design, the balance between job demands and resources, well-communicated goals and mandates, and factors that contribute to a "healthy" workplace (Deci et al., 2017).

Second, managers' *competence support* can be enhanced by training, continuing education, and opportunities for development; a climate that encourages skill utilization; positive feedback that highlights employees' competencies; help for employees to structure their ideas and perspectives; and clear organizational and employee goals. In contrast, competence thwarting involves over-emphasis on performance, messages that signal incompetence, and communication of negative feedback in front of others. Third, managers' *relatedness support* can be enhanced by relating to employees in warm and caring ways during social situations, meetings, and seminars at work; enabling cooperation in which employees can discuss their feelings, knowledge, and actions; and remaining non-judgmental toward unpleasant cognitions and emotions that are expressed by their employees. In contrast, relatedness thwarting involves the withdrawal of attention and affection when employees do not "live up to" the managers' expectations, which can promote not only fear of failure (Elliot & Thrash, 2004), but also less knowledge sharing. Over time, due to the suggested reciprocal influences between autonomy support and development of causality orientations, employees are expected to be more autonomous and less controlled and impersonal, as well as less preoccupied with fear of failure in the work context (Ryan & Deci, 2017); as a consequence, employees share more knowledge—if support of autonomy, competence, and relatedness are maximized in the work context.

Limitations and directions for future research

Several limitations deserve mention. First, all data were collected using self-report. A variety of validated measures were used, yet it is important for future research to replicate this study using (for example) observations of knowledge sharing behavior in order to improve the methodological design. Second, we are comfortable with generalizing the findings from the current study to the population of dental hygienists in Norway because nearly 30% of that population were included herein, yet it is important for future research to replicate this study using respondents in various countries and in other professions. Third, our prospective cohort study design with temporal separation between the independent and dependent variables met the first criterion for establishing causality (Antonakis, Bendahan, Jacquart, & Lalive, 2010), and the significant associations between the baseline and distal measures satisfied the second criterion for establishing causality (Bollen, 1989). Yet the criterion of "isolation," such that the association between the independent and dependent variables cannot be explained through other causes (Antonakis et al., 2010), was not fulfilled, which precludes the conclusion of causality (Bollen, 1989). Hence, it is important for future research to develop and evaluate interventions that target managerial styles, causality orientations at work, and fear of failure. Of course, such research can build off of the prospective cohort design of the current study in which 18 months of temporal separation was present between the independent and dependent variables and common method bias was likely reduced (Podsakoff et al., 2012).

Conclusion

A person-centered approach revealed four unique, distinct profiles of dental hygienists that are based on their perceptions of managerial autonomy support and managerial control, causality orientations, and fear of failure. The most self-determined profile reported a higher level of knowledge sharing at work at 18 months than dental hygienists who belonged to less self-determined profiles. Accordingly, it is important for organizations to enhance efforts that can promote perceptions of more managerial autonomy support and less managerial control, as such efforts might function to enhance the autonomy orientation and reduce the control and impersonal orientations and fear of failure. If so, then such efforts might function to facilitate knowledge sharing among employees at work, too.

Competing Interests

The authors have no competing interests to declare.

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