



New insights into an old debate: Investigating the temporal sequence of commitment and performance at the business unit level

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Job attitudes and performance are correlated, but which comes first? Despite a long-lasting debate regarding this question, the potential ordering of the job attitude–job performance relationship and its ideal timing of measurement over time remains unclear. Based on the hedonic treadmill theory and the endowment/contrast model, we develop arguments as to why the influence of performance on subsequent attitudes might be less persistent over time than vice versa and we suggest a strategy to determine the ideal period for measurement time lags. We contrasted both temporal directions within a data set of 755 employees from the retail banking division of a large bank, nested in 34 business units, for the period of 2005–2008, allowing for a controlled environment and consistent data capturing over time. We studied the relationship of organizational commitment aggregated to the business unit level with two business unit performance indicators (financial achievement and customer satisfaction). Results indicated that organizational commitment had a more persistent influence on performance at the business unit level than vice versa. Consistent with prior research, this suggests that job attitudes may come first, and that practitioners might be well advised to aim to improve job attitudes in order to boost performance.

Practitioner Points

- Our study suggests a potential answer to the chicken-and-egg problem (i.e., the temporal ordering of the job attitude–job performance relationship): Our theory and data suggest that the influence of performance on subsequent attitudes might be less persistent over time than vice versa.
- Our study sheds new light onto which timely dimensions are involved in the job attitude–job performance relationship: While the impact of performance on attitudes diminishes after 1 year, the impact of attitudes on performance lasts up to 3 years.
- Our results may be relevant for practitioners when it comes to evaluating the benefits of human resource initiatives and adding dollar values to the discussion around attitudinal changes.

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The relationship between job attitudes and job performance is a core theme in the field of human resource management. Many organizations invest large amounts of money into employee attitude surveys and use the results to develop actions aimed at improving employee attitudes (such as organizational commitment), in the hope that this will lead to superior organizational performance. But is this hope justified? And what is the right interval at which to conduct such measurement? It is largely undisputed that there is a cross-sectional correlation between job attitudes and performance, both on the individual level and on higher levels such as the business unit (e.g., Cooper-Hakim & Viswesvaran, 2005; Harrison, Newman, & Roth, 2006; Harter, Schmidt, & Hayes, 2002; Judge, Thoresen, Bono, & Patton, 2001; Meyer, Stanley, Herscovitch, & Topolnysky, 2002; Riketta, 2002). However, the debate regarding the likely causal relationship between job attitudes and performance is far from being resolved, and equally unclear is what the ideal period of measurement might be.

There are several reasons why this debate persists. First, any attempt to examine the causality of the job attitude–job performance relationship requires experimental evidence (which is difficult to obtain with applied samples) or, at the very least, longitudinal evidence (which cannot prove a causal relationship but can make it more plausible). Yet, longitudinal studies on this relationship are surprisingly rare. At the individual level, Riketta's (2008) meta-analysis on the relationship between job attitudes and performance relied on 16 studies. At the business unit level (which is the level on which many strategic decisions are made, see Gelade & Ivery, 2003), we are only aware of one published longitudinal study with more than two waves (Harter, Schmidt, Asplund, Killham, & Agrawal, 2010). At the organizational level, only Schneider, Hanges, Smith, and Salvaggio (2003) have explored this relationship with the required empirical rigor, using a heterogeneous sample ranging between 12 and 35 organizations over 8 years. Second, although there are good theoretical reasons (as explained later) to assume that differences in time lags lead to different results, only Schneider *et al.* used a multi-wave sample with equal intervals between the measurements (see also Ployhart & Vandenberg, 2010). Third, the studies conducted so far have yielded contradictory results. While Harter *et al.*'s (2010) results pointed towards an effect of job attitudes on job performance, Schneider *et al.* (2003), despite having a significantly smaller data set, interpreted their data as suggesting the opposite causal direction.

The central aim of the current study is therefore to shed new light on the key question of how to determine an adequate point in time to measure attitude–performance links, and whether job attitudes (more precisely, organizational commitment as an exemplary job attitude, see Harrison *et al.*, 2006; Riketta, 2008) and performance are equally persistent in influencing each other over time. To achieve this, we address a ‘universal limitation of studies of this sort which is the fact that it is not known whether the time intervals used are those that are theoretically appropriate’ (Harter *et al.*, 2010, p. 387). In doing so, this multi-wave study contributes to the literature in several ways. First and most importantly, we develop theoretical arguments to explain timing differences on the effect of job attitudes on business unit performance and vice versa, and make a suggestion of what the ideal period for measurement might be. Second, we examine the effect of job attitudes on performance at the business unit level within a 4-year data set, which allows for a stable setting and consistent data capturing. Third, we use customer satisfaction as an additional performance indicator, which has not previously been studied over such a long time frame despite sound arguments for both the theoretical and the practical importance of this variable.

Theoretical models

Various models exist that aim to explain positive correlations between job attitudes and performance (e.g., Brief & Weiss, 2002; Brown & Peterson, 1993; Harrison *et al.*, 2006; Judge *et al.*, 2001; Meyer & Allen, 1997; Mowday, Porter, & Steers, 1982; Staw, Sutton, & Pelled, 1994), the most prominent of which we will summarize in the following section.

Model 1: Job attitudes cause performance

This model suggests a causal effect of job attitudes on performance. Probably the oldest explanation of why attitudes cause performance is that attitudes cause behaviour that is in line with a favourable evaluation (Eagly & Chaiken, 1993). This view is often attributed to the human relations movement (Judge *et al.*, 2001; Strauss, 1968). Model 1 states that attitudes function as facilitators and guidelines of behaviour (e.g., Judge *et al.*, 2001) and it refers to the energizing and facilitative effects of positive affect at the workplace (e.g., Staw *et al.*, 1994). Furthermore, it points to the motivational effects of the importance of identification with the job, business unit, or the organization, for instance as a component or consequence of commitment (Meyer, Becker, & Vandenberghe, 2004). For customer satisfaction, the same argument can be found in the marketing literature: A happier team delivers better customer service quality and, through improved service quality, drives customer satisfaction (Heskett, Jones, Loveman, Sasser, & Schlesinger, 1994; Homburg, Wieseke, & Hoyer, 2009).

Model 2: Performance causes job attitudes

In contrast to model 1, expectancy-based theories of motivation state that job attitudes follow from internal or external rewards (e.g., a pay raise, bonus, recognition, feeling good at work) that are produced by performance (e.g., Lawler & Porter, 1967; Naylor, Pritchard, & Ilgen, 1980; Vroom, 1964). Similarly, in terms of customer satisfaction, Luo and Homburg (2007) argued that satisfied and loyal customers lead to a more positive atmosphere in companies and thus to an improvement in job attitudes, because employees generally enjoy their jobs more. Following the logic of model 2, job attitudes would be related to preceding business unit financial performance and customer satisfaction.

Model 3: Job performance and job attitudes cause each other

Combining these two viewpoints leads to the idea of reciprocal relationships, that is, of mutual causal effects between job attitudes and job performance (e.g., Sheridan & Slocum, 1975; Wanous, 1974). Reciprocal models are hybrid models of the previous two approaches (Judge *et al.*, 2001), leading to a bi-directional connection between indicators of job attitudes and performance.

All three theoretical models have received at least some empirical support, which leaves an inconclusive picture. Nevertheless, all models suggest a cross-sectional relationship between job attitudes and performance – a relationship that we would like to replicate on the business unit level of analysis (Gelade & Ivery, 2003). The business unit level is an important level of analysis (although rather neglected by research) because in many organizations, performance is determined by higher level organizational entities such as, retail stores, branches of a bank, plants of a factory, etc. Such units can be compared to each other if they use the same kind of resources and generate the same

kind of outputs, and they often get rewarded as a unit. Studying data on the business unit level is also important because this is the level on which employee survey data are typically reported (Gelade & Ivery, 2003; Harter *et al.*, 2002). Business unit level research thus provides opportunities to establish linkages with outcomes that are directly relevant to the business and with organizational performance indicators that often only exist on the group level. For example, the bank from which we obtained our data uses two performance indicators that are only assessed on the business unit level: a composite financial measure containing several variables (e.g., the net new assets acquired) and customer satisfaction with the business unit (see also Harter *et al.*, 2002). Additionally, the aggregation of individual-level data has some methodological advantages: It leads to a more reliable measurement of data collected on the individual level due to a reduction in error variance (LeBreton & Senter, 2008). Furthermore, the collection of both attitudinal and performance-related data within the business units of one single organization ensures a high level of standardization of the measured variables and controls for the influence of organization-specific conditions and policies. Therefore, more formally, we hypothesize the following:

Hypothesis 1 (a): There will be a positive cross-sectional correlation between organizational commitment aggregated to the business unit and business unit financial performance.

Hypothesis 1 (b): There will be a positive cross-sectional correlation between organizational commitment aggregated to the business unit and customer satisfaction with business units.

The role of time

The theoretical approaches that have previously been used to describe the relationship between job attitudes and performance (e.g., expectancy-based theories of motivation) do not offer an explicit timeline outlining the range of time within which the predicted effects (e.g., increased motivation by internal and external rewards) might occur. Therefore, we rely on the hedonic treadmill model (Brickman & Campbell, 1971). This model helps to specify a timeline because it suggests that good and bad events only affect attitudes temporarily (Diener, Lucas, & Scollon, 2006). It suggests that the motivating effect of, for example, unit-based rewards might be a short-term phenomenon only, because people adapt to improved circumstances to the point of affective neutrality, and in the long run, rewards yield no real motivating effect (Kahneman, 1999). Adaptation refers in this respect to a reduction in the affective intensity of favourable (and unfavourable) events over time and is assumed to be a function of past stimuli (Frederick & Loewenstein, 1999). Such adaptation processes have been empirically confirmed in many studies. For example, Clark (1999) presented evidence from British data that job attitudes are strongly related to changes in employees' pay but not to absolute levels of pay, and Suh, Diener, and Fujita (1996) found that positive life events (e.g., promotion, raise, improvement in financial status) affected happiness only if they had occurred in the past 3 months.

Although the hedonic treadmill model does not specify the range of time in which the adaptation effect might occur (i.e., what the short-term and long-term effects are), such a specification can be made with the endowment/contrast model (Cheng, 2004; Tversky & Griffin, 1991). This model states that any pleasant stimulus reduces the pleasure associated with subsequent stimuli of the same kind (i.e., internal and external rewards). In an organizational setting, the motivational effect of rewards may diminish after 1 year,

because after this time, new relevant stimuli are available (e.g., a higher or lower bonus for the next year) based on the organization's systems time cycle (Mitchell & James, 2001), which is usually the economic year.

In contrast, we expect the influence of job-related attitudes to be more persistent, because they can be expected to be relatively stable over time (e.g., Dormann & Zapf, 2001; Lam, 1998). For example, organizational commitment and job satisfaction have been found to be highly stable over 5 years (Bowling, Beehr, & Lepisto, 2006). Thus, if the aforementioned model 1 is correct (i.e., higher job attitudes lead to better performance), high job attitudes could have long-lasting effects on performance. As an example, a committed sales team of a financial service provider that has acquired new customers at time t_1 is likely to generate profits (e.g., out of product sales and new monetary assets as important indicators of a financial service provider's financial performance) not just from a short-term perspective (i.e., 1-year lags) but also from a long-term perspective (i.e., 2- and 3-year lags), due to the customers' repurchase behaviour.

The same should be true for customer satisfaction as a performance indicator, because creating and maintaining customers' loyalty in organizations is affected by employees' commitment (Singh, 2000). Building and maintaining long-term customer relationships is important for improving business performance, particularly for services such as banks (Ennew & Binks, 1996). If customers have positive experiences with a company's employees, their repurchasing intentions, and thus the company profits, are likely to increase (Walsh, Evanschitzky, & Wunderlich, 2008).

Regarding the job attitude-performance relationship, the empirical evidence offers tentative support for the argument that the possible consequences of good performance (e.g., pay raise, bonus) will likely wane over a period of more than 1 year, whereas the possible consequences of high job attitudes will continue. Riketta's (2008) individual-level meta-analysis found that the effect of job attitudes on performance persisted over several intervals (with stronger effects for shorter than for longer time lags), whereas the effect of performance on job satisfaction was non-significant for short time lags and significantly negative for moderate time lags. The study by Harter *et al.* (2010) found evidence on the business unit level supporting the causal impact of employee perceptions on financial performance criteria, whereas the reverse causality of these measures on employee perceptions was only weak. Despite varying time periods between the measurement points, this study was based on a large longitudinal database and yields the strongest inference for potential causal direction on the business unit level so far. The Schneider *et al.* (2003) study on the organizational level of analysis showed that the effect of organizational performance on one particular satisfaction facet (i.e., satisfaction with pay) diminished over a 4-year period, whereas the same satisfaction facet emerged as a significant predictor of performance over the same period, which also supports this line of argumentation. However, this pattern was not found for other satisfaction facets. Furthermore, the organizations in the study by Schneider *et al.* differed according to which subset of items (capturing different job satisfaction facets) they used, and on occasion organizations changed the items between waves.

Based on the theoretical arguments regarding the potential temporal ordering and the arguments in favour of using multi-wave samples, and with the business unit of a company as the level of analysis, we formulate the following hypotheses:

Hypothesis 2 (a): Organizational commitment aggregated to the business unit will predict business unit financial performance not only in the short term (1-year lags) but also in the medium term (2-year lags) to long term (3-year lags).

- Hypothesis 2 (b)*: Organizational commitment aggregated to the business unit will predict customer satisfaction with the business unit not only in the short term (1-year lags) but also in the medium term (2-year lags) to long term (3-year lags).
- Hypothesis 3 (a)*: Business unit financial performance will predict organizational commitment aggregated to the business unit on a short-term (1-year lags) basis, but not on a medium-term (2-year lags) to long-term (3-year lags) basis.
- Hypothesis 3 (b)*: Customer satisfaction with business units will predict organizational commitment aggregated to the business unit employees' commitment on a short-term (1-year lags) basis, but not on a medium-term (2-year lags) to long-term (3-year lags) basis.

Testing these hypotheses requires a multi-wave design, ideally with equal time lags (Zapf, Dormann, & Frese, 1996) because data over multiple instances of the same time lags can be pooled, allowing researchers to strengthen the statistical inference (Hayes, 1998) and to simplify the presentation of complex relationships (see Schneider *et al.*, 2003). Therefore, we look at multiple combinations of correlates over time to find out whether they result in a consistent pattern in our four-wave data set.

Method

Sample

We collected data from the business units of the retail banking division of a large Swiss bank for the years 2005–2008. This bank is a major global financial service provider, which is headquartered in Switzerland. Like many other companies in the financial service industry, the period of 2005–2008 was affected by an economic recovery. The peak in economic activity occurred at the end of 2007, and was followed by an economic downturn over the following years in which the financial services industry faced a contraction forcing them to reduce carrying risky assets, maintain higher capital ratios, and meet higher regulatory standards. However, the bank from which our data stems produced constant positive revenues and employed a stable number of employees. The findings of this study were only made available to the bank in 2009, thus not affecting the data collection in any way.

The average sample per year consisted of the individual-level data of 755 employees (4-year average). The average sample size per business unit was 18 people ($SD = 9$). The number of data points from the different business units varied from 42 (2007) to 34 (2005 and 2008) due to the availability of data (which, for reasons of anonymity, was only granted when a business unit contained more than eight employees) and due to minor reorganizations (opening of new branch offices or closing of old ones). Employees in this bank receive a performance-related bonus based on the targeted financial business unit achievement of the whole year.

Measures

Data for organizational commitment stem from a yearly company-wide employee survey, conducted by an external service provider on behalf of the bank. The average response rate was 84% ($SD = 11\%$). The surveys were administered between July and August every year and items were consistently used in the same format (6-point Likert scale). Participants were invited by e-mail to fill in the surveys in an online form. Participation was anonymous, and was encouraged but not mandatory.

Organizational commitment

The six items that were used to capture employees' organizational commitment stemmed from a short form of the organizational commitment questionnaire by Mowday *et al.* (1979). The original number of items was shortened to prevent survey fatigue (Stanton, Sinar, Balzer, & Smith, 2002). The items referred to the employees' willingness to stay with the company, their willingness to go beyond what is normally expected, and how they talk to other people about what it is like to work for this company as well as similar aspects (referred to as 'say-stay-serve' and labelled as 'employee engagement' within the company where the measurement took place). The items are as follows (the true name of the company has been replaced by 'this company'): 'I would not hesitate to recommend this company to a friend seeking employment'; 'Given the opportunity, I tell others great things about working at this company'; 'It would take a lot to get me to leave this company'; 'I rarely think about leaving this company to work somewhere else'; 'My company inspires me to do my best work every day'; 'My company motivates me to contribute more than is normally required to complete my work'. Other banks rely on a very similar approach to measure organizational commitment (e.g., Fischer & Mittorp, 2002).

We explored evidence related to the aggregation of organizational commitment to the unit level of analysis by examining $r_{wg(j)}$, a commonly used statistic for justifying aggregation (James, Demaree, & Wolf, 1984). This defines agreement in terms of the proportional reduction in error variance, meaning that higher scores indicate greater reduction in error variance and thus higher levels of agreement (LeBreton & Senter, 2008). Values of $r_{wg(j)}$ of above .70 have been used as the traditional cut-off point indicating high inter-rater agreement (Lance, Butts, & Michels, 2006; LeBreton *et al.*, 2003; LeBreton & Setner, 2008). The average for organizational commitment was calculated for each business unit for each year of the database, and the results were then averaged. The average $r_{wg(j)}$ for employees' organizational commitment was .78, indicating sufficient within-group agreement to aggregate this variable to the business unit level of analysis. Additionally, we calculated the intra-class correlation coefficient $ICC(1,k)$, representing an assessment of the extent to which the mean rating assigned by a group of judges is reliable. Compared to the average $ICC(1)$ value reported in the organizational literature of .12 (James, 1982) and the values reported in earlier studies on job attitudes and firm performance at the organizational level (e.g., Schneider *et al.*, 2003, .05-.19), our average value of .41 for organizational commitment is satisfactory. Unlike earlier studies, we omitted $ICC(2,k)$ because this indicator is only appropriate when the same raters are nested in targets (Wirtz & Caspar, 2002), which is not the case when comparing different teams, composed of different, independent team members.

Financial performance index

A common measure used to cover business unit financial performance in retail banking is a composite measure that contains the net new assets acquired, the overall mortgage volume net increase, and the sales achievement (e.g., of structured financial products). The components of this index show strong inter-correlations but we treat them as belonging to an index rather than to a scale, because this measure may be better construed as outcomes that together form an index of accuracy rather than as manifestations of a single underlying construct (Edwards & Bagozzi, 2000; Streiner, 2003; Trougakos, Beal, Green, & Weiss, 2008). Even though we treat this measure as a single item, reliability

can be calculated, given the fact that we measure this construct more than two times ($rel = .71$, Schmidt & Hunter, 1996).

The bank from which the data of this study stem developed and refined such a measure over many years. The measure serves as the internal financial controlling and goal-setting process and is available at the business unit level only. The bank calculates business unit performance by aggregating individual-level performance (including the above-mentioned financial achievements) out of group efforts and collaboration within the business unit. The evaluation takes into account the team size and the location (i.e., if a business unit is in a rural or a city region). However, psychologically speaking, recognition is given on the business unit level at the end of the year through the provision of pools of financial remuneration depending on the business unit performance. Individual differences are drawn based on the judgement of the direct manager, who recognizes individual performance differences, but they ultimately all depend on the joint effort of the whole business unit. For our analysis, we used a 12-month average measure (January to December) as provided by the bank. All values are weighted depending on the size of the respective business unit and represent an index of the financial performance of each business unit.

Customer satisfaction

Data on customer satisfaction stem from the bank's yearly data collection efforts between March and August, when about 2000 customers are asked about their service quality perceptions of the respective business unit during a structured telephone interview. A key concept to cover the aspect of customer satisfaction and future growth that is used by this bank is to measure the customers' intention to recommend the services of the bank to others, measured by a single item ('How likely is it that you will recommend the services of this bank to a friend or colleague?'). This is a common method of assessing customer satisfaction in the marketing sciences, especially in the banking context (e.g., Harter *et al.*, 2010; Kamakura, Mittal, de Rosa, & Mazzon, 2002). The reliability can be calculated, as we measure this construct more than two times ($rel = .81$, Schmidt & Hunter, 1996).

Important to note here is that this measure can be best attributed to the business unit performance as a whole (and not to an individual employee), as a customer's experience is shaped by the joint effort of the whole business unit (e.g., availability of services). Additionally, customer satisfaction is reported and fed back not individually, but on the business unit level only.

Results

Strategy of analyses

As we had at our disposal multi-wave data from employee attitude surveys, the financial business unit performance indicators and the customer perceptions, it was possible to calculate the stability of these data sets over time, and lagged analyses relating the data sets were feasible. Table 1 shows both the inter-correlations of the measures used in this study and the stabilities (test-retest stability of a given variable, see also Schneider *et al.*, 2003). We can accept our set of Hypothesis 1(a) and (b) (business unit commitment and business unit performance correlate cross-sectionally; average weighted correlations: commitment-financial performance, $r = .54$, $p < .01$;

Table 1. Inter-correlations between the Business Unit Employee Attitude Scales and the Business Unit Performance Indicators

	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Commitment 2005	4.48	0.25	(.89)										
2. Commitment 2006	4.57	0.32	.30	(.89)									
3. Commitment 2007	4.67	0.47	.40*	.44*	(.91)								
4. Commitment 2008	4.82	0.24	.47*	.31	.61**	(.88)							
5. Financial performance 2005	0.92	0.23	.47*	.47*	.23	.22	—						
6. Financial performance 2006	0.82	0.25	.55**	.56**	.37*	.14	.78**	—					
7. Financial performance 2007	0.72	0.29	.42*	.46**	.59**	.30	.63**	.69**	—				
8. Financial performance 2008	0.65	0.24	.52**	.43*	.25	.54**	.59**	.50**	.41*	—			
9. Customer satisfaction 2005	3.65	0.25	.47*	.33	.04	-.03	.49**	.44**	.22	.10	—		
10. Customer satisfaction 2006	3.73	0.25	.45*	.33	.30	.14	.53**	.56**	.34*	.29	.83**	—	
11. Customer satisfaction 2007	3.69	0.28	.51**	.48**	.29	.25	.48**	.49**	.40*	.34	.80**	.83**	—
12. Customer satisfaction 2008	3.33	0.23	.29	.32	.16	-.03	.30	.43*	.27	.09	.80**	.80**	.74**

Note. Scale inter-correlations were calculated at the business unit level of analysis. Cronbach's alphas are on the diagonal, wherever appropriate. N = 34–42.
* p < .05; ** p < .01.

commitment–customer satisfaction, $r = .27, p < .05$). The ranges for the stability values are comparable to earlier studies in the context of job attitudes and firm performance (e.g., Schneider *et al.*, 2003). The statistics of interest are the cross-lagged correlations for the 1-, 2-, and 3-year time lags (Schneider *et al.*, 2003). First, we analysed every single time lag for the 3 years separately. Second, we pooled the correlation coefficients by calculating weighted averages. Before averaging the correlations for a particular time lag, we tested whether these correlations were from the same population (Schneider *et al.*, 2003). We performed the test of homogeneity of correlations (Hedges & Olkin, 1985) to test whether the correlations from the same time lags could be averaged. None of the pooled correlations revealed significant Q values, indicating that homogeneity existed and therefore that pooling the correlations was acceptable. We then calculated the weighted averages by weighting each correlation for a given lag by the number of business units involved in the calculation of that correlation for that lag, thereby equating correlations over time for the sample size on which they were based (here, the number of business units).

Next, we examined the magnitude of the correlations of attitudes as predictor versus performance as predictor (see Table 2). As in previous studies (e.g., Harter *et al.*, 2010), we corrected for measurement error to perform this analysis. Attitude as predictor consistently yielded higher correlations with preceding performance than vice versa. More specifically, there was not a single case in which performance as predictor yielded a higher correlation value than attitude as predictor. All of the correlations where business unit commitment served as predictor reached statistical significance, which was not the case for the other direction, as none of the 2- and 3-year lags of performance as predictor reached significance. This is the first indication that attitudes are a better predictor of preceding performance than vice versa.

As a next step, we compared the cross-lagged correlations of the three different time lags by applying the procedure suggested by Steiger (1980) for comparing non-independent correlations. This provides us with an indication of whether the differences in the lagged correlations (Δr_c) are statistically significant. The larger the Δr_c , the more likely that there is a difference in predictive power of one predictor over the other, and this provides an indication of whether attitudes or performance is a better indicator of the respective criteria. The Δr_c values in the 1-year lags were all close to zero, indicating that no differences in the predictive power of attitudes and performance may exist in 1-year lags. As the first analytical step revealed meaningful correlations for both predictive directions, this points towards a reciprocal relationship of the data. This picture changes when looking at the 2-year lags: While the averaged correlations for commitment as predictor remain significant and high, the average r_c 's of performance as predictor drop. The resulting Δr_c 's become significant at the $p < .05$ level for commitment as predictor of customer satisfaction, and at the $p < .10$ level for commitment as predictor of financial performance. Even though the significance level in the latter case did not reach the conventional $p < .05$ level, the difference in predictive power ($\Delta r_c = .30$) reaches medium effect size (Cohen, 1992) and such values range in the middle to upper range of effects that can be found according to Hemphill's (2003) empirical guidelines for interpreting the magnitude of correlation coefficients. The 3-year lags showed even greater Δr_c values, which all became significant at the $p < .05$ level for commitment as predictor of subsequent financial business unit performance and customer satisfaction.

In addition, we calculated confidence intervals. Critics argue that null-hypothesis significance testing is easily misunderstood (e.g., Hunter, 1997) and that this approach to inference tends to obscure study findings by encouraging attention to p -values or

Table 2. Average r_c , Δr_c , and confidence intervals of differences in correlations for attitudes as predictor and performance as predictor

Time lags	Attitude as predictor	Average r_c	Performance as predictor	Average r_c	Δr_c	CI delta 90%		CI delta 95%		Expected range based on hypotheses
						LB	UB	LB	UB	
1-year lags	Commitment	.52** .43**	Financial performance Customer satisfaction	.48** .34*	.05 n.s. .09 n.s.	-.20 -.18	.30 .35	-.25 -.23	.35 .40	CI including 0 CI including 0
3-year lags	Commitment	.66** .35*	Financial performance Customer satisfaction	.27 n.s. -.03 n.s.	.39* .38*	.13 .07	.66 .64	.08 .01	.70 .68	CI excluding 0 CI excluding 0

Note. r_c , correlations corrected for measurement error; Δr_c , difference between the two (corrected) correlations, where the indicated significance level represents the results according to the procedure for comparing non-independent correlations suggested by Steiger (1980); CI, confidence interval based on Zou (2007); LB, lower bound; UB, upper bound. # $p < .10$; * $p < .05$; ** $p < .01$; n.s., nonsignificant.

even number of asterisks reported in tables, rather than the actual effect size (e.g., Hoyt, Imel, & Chan, 2008). These authors suggest evaluating the practical significance of the relations under investigation, rather than the statistical significance (Hoyt *et al.*, 2008; Kirk, 2007). In the case of comparing correlations, a confidence interval can avoid some of the problems mentioned above by providing a range of plausible parameter values and thus may be more informative when reporting research work (Olkin & Finn, 1995). Zou (2007) has recently developed a general method for comparing correlation coefficients taking into account both the stabilities and the asymmetry of the confidence limits around individual effect sizes. He has shown that this method has statistical properties superior to available alternatives, especially for small sample sizes. We applied the SAS macro for non-overlapping correlations described by Zou (2007), which he kindly provided to us, and those results are presented on the right-hand side of Table 2 (i.e., confidence intervals at the 90% and 95% levels).

The confidence intervals revealed that the range covered a large area in the positive for the 2- and 3-year lags, but not for the 1-year lags. This is in line with our Hypotheses 2 and 3, as seven of eight confidence intervals for the 2- and 3-year lags exclude zero, whereas all confidence intervals for the 1-year lags include zero (see Table 2).

To summarize, organizational commitment was a persistent predictor of subsequent business unit performance indicators, supporting Hypothesis 2(a) and (b). Furthermore, we can accept Hypothesis 3(a) and (b) because business unit performance indicators were significant predictors of business unit commitment from a 1-year perspective, but not from a 2- to 3-year perspective. Thus, our results suggest that from a 1-year perspective, a reciprocal relationship may exist. In turn, for 2- and 3-year lags, job attitudes may be stronger predictors of proceeding performance than the other way around. Overall, our results are in line with previous research (e.g., Harter *et al.*, 2010) and fully reflect the assumptions that were made based on our theoretical considerations.

Discussion

The present study adds to the growing linkage literature by depicting a theoretical model that aims to explain timing differences on the effect of job attitudes on business unit performance and vice versa. Subsequent data analysis of a four-wave data set confirmed this theoretical framework that is largely based on the hedonic treadmill model (Brickman & Campbell, 1971) and the endowment/contrast model (Cheng, 2004; Tversky & Griffin, 1991). These models were used to reason that the motivational effect of rewards such as bonuses may diminish after 1 year (i.e., an adaptation process), whereas the effect of high commitment levels will not decrease. The finding that the effect of performance on commitment faded away over the years could be considered as evidence for the adaptation process predicted by the hedonic treadmill model and the endowment/contrast model.

Furthermore, we investigated the relationship between aggregated organizational commitment (as an important job attitude) and business unit financial performance as well as business unit customer satisfaction over time to confirm our theoretical framework. Our results suggest that commitment and financial performance as well as customer satisfaction are reciprocally related when looking at 1-year lags. More importantly, the picture changed when we looked at the 2- and 3-year lags, because we found reasonably strong correlations between previous commitment and subsequent

financial performance and customer satisfaction, but did *not* find correlations in the reverse direction. Thus, cross-lagged panel correlations suggested that aggregated commitment predicts financial performance and customer satisfaction in the long run, but not vice versa.

In the introduction, we outlined three theoretical models that describe the relationship between job attitudes and performance outcomes (i.e., job attitudes cause performance, performance causes job attitudes, and there is a reciprocal relationship between the two). Our results speak in favour of the third model, but with the qualification that the job attitudes \rightarrow business unit performance path may deserve more weight. From a 1-year perspective, our results pointed to a reciprocal relationship, as the third model assumes. After that period, our results predominantly supported only the assumption that job attitudes have an effect on business unit performance. It should be noted that obtaining such a result was only possible due to the analysis of a multi-wave data set.

Our results fit better with the meta-analytical evidence on the individual level (Riketta, 2008) and the business unit level (Harter *et al.*, 2010) than with the organizational-level study by Schneider *et al.* (2003). Riketta found weak evidence for attitudes being a more persistent indicator of job performance than vice versa. On the other hand, Schneider *et al.* (2003) found an ambiguous pattern of the relationship between job attitudes and job performance, with a tendency for performance to be the stronger predictor.

The longitudinal effects of job attitudes on business unit financial performance and customer satisfaction may be considered remarkably strong. The correlations we found were often higher than one would expect based on meta-analytical cross-sectional findings (e.g., Judge *et al.*, 2001) or recent evidence on the business unit level (Harter *et al.*, 2010). One explanation for these strong effects is that luck made an upward bounce from the true values possible because of the small sample size (on the business unit level). An alternative explanation is that these effects are due to the rigorous measurement practice by the organization from which the data of this study stem. In particular, the composite measure of financial business unit performance is a construct that was refined over many years prior to our study. If the same calculations are redone with only one of the composites of the index (e.g., net new assets) for financial performance, the values become comparable with the values found in the meta-analysis by Judge *et al.* (2001). Moreover, our ICC(1,*k*) values were satisfactory, which indicates relatively low levels of measurement error within our data. This, in turn, is likely to increase the strength of the effects. Furthermore, unlike in prior longitudinal studies, all of our measures remained entirely the same for the 4 years under investigation, time lags were equal for all measurement periods and data points, and we obtained our data within the same company.

We conducted our analysis on the business unit level, which is an important (and far too often neglected) level as it is the one on which many strategic decisions are made (Gelade & Ivery, 2003). The importance of the business unit is also shown by the amount of shared variance in organizational commitment (i.e., the r_{wg} and ICC values), indicating that the business unit is also psychologically relevant, perhaps due to social comparisons between members of different business units (e.g., Festinger, 1954; Garcia, Tor, & Gonzalez, 2006), emotional contagion (e.g., Dasborough, Ashkanasy, Tee, & Tse, 2009; Tee, 2008), the impact of managerial behaviour (e.g., Felfe & Heinitz, 2010; Korek, Felfe, & Zaepernick-Rothe, 2010), or general group-level motivation phenomena such as social loafing (e.g., Mulvey & Klein, 1998). Although it was not the purpose of this study

to investigate these psychological processes in detail, they surely deserve more research attention.

Our results may be encouraging for practitioners, because a logical consequence of our findings, along with previous research in this field, is that human resource investments for increasing job attitudes, if effective, might lead to long-term improvements in both financial performance and customer satisfaction (see also Patterson, West, Lawthom, & Nickell, 1997; Van De Voorde, Paauwe, & Van Veldhoven, 2010; Van De Voorde, Van Veldhoven, & Paauwe, 2010). However, human resource practitioners need to be aware that several studies have shown that there are natural limits to the amount by which job attitudes can be improved (Bowling *et al.*, 2006; Frederick & Loewenstein, 1999; Haidt, 2006; Tziner, Waismal-Manor, Vardi, & Brodman, 2008).

Furthermore, our results can be relevant for practitioners when it comes to evaluating the benefits of human resource initiatives and adding dollar values to the discussion around attitudinal changes: Some authors have suggested using unstandardized path coefficients (Boudreau & Ramstad, 2003, 2007; Cascio & Boudreau, 2008; for an illustrative example see Winkler, König, & Kleinmann, 2010). This notion has already been mentioned in the context of personnel selection by both Burke and Pearlman (1988) and Schmidt (1993), who suggested percentage improvement in productivity as a potentially valuable means of expressing utility. The outcomes of such analysis are path coefficients or regression weights that give an indication of what the expected outcome in a dependent variable will be, based on a given change in the independent variable (Cascio & Boudreau, 2008; Gelade & Ivery, 2003; Gelade & Young, 2005; Mirvis & Lawler, 1977). We refrain from applying this method to our data set, because the overall sample size was too small. However, the potential of such cost-benefit comparisons of attitude-behaviour relationships with larger data sets in practice could be enormous (Boudreau & Ramstad, 2007; Cascio & Boudreau, 2008), but only makes sense if the predictive flow goes from attitudes to performance. Our results indicate that the predictive ordering might indeed be from job attitudes to performance, thus confirming the basic assumption of these initiatives.

Finally, we wish to emphasize the importance of communicating effect sizes such that practitioners can understand their practical significance (Kirk, 2007; McCartney & Rosenthal, 2000). A useful tool for this purpose is the binomial effect size display (Rosenthal & Rubin, 1982). Translated into this display, the present finding of the relationship between commitment and subsequent 1-year customer satisfaction of $r = .43$ means that business units with higher employee commitment have a 151% higher likelihood of belonging to the half with higher customer satisfaction than those units with less committed employees. As this is a rather impressive number, practitioners would likely continue to be willing to invest in measures of job attitudes. An alternative way of communicating effect sizes is to compare the correlational results with findings from other disciplines that are generally known, accepted, or illustrative. For example, the correlation between male consumption of Viagra and sexual performance has been calculated to be $r = .38$ (Goldstein *et al.*, 1998), which is similar to the relationship between employee commitment and subsequent 1-year customer satisfaction.

Limitations and future research

Some limitations have to be mentioned. First, our study was conducted within one organization within one country, meaning that the generalizability of the results might be questioned. However, the potential benefit from a single-company study like this is

that it allows a number of variables, such as geographical distinctness (Wright, Gardner, Moynihan, & Allen, 2005) and job complexity, to be controlled for. Furthermore, the relatively homogenous market environment in Switzerland controls for the local markets that could impact profitability (e.g., markets with higher socio-economic conditions result in those business units having naturally higher profits), and the consistent measurement of both the performance and the attitude measures was guaranteed.

Second, although the logic of the cross-lagged panel correlation technique is intuitively appealing, some researchers have argued against using it (e.g., Campbell & Kenny, 1999; Zapf *et al.*, 1996), stating that the difference between the cross-lagged correlations also depends on the stabilities of both variables (Zapf *et al.*, 1996). More precisely, the potential influence of the stabilities is that a significant cross-sectional correlation between two variables *A* and *B* at time t_0 will, by trend, be more likely to remain significant for the proceeding cross-lagged correlations (the t_0-t_2 and t_0-t_3 cross-lagged correlations, following the t_0-t_1 correlation) for the predicting variable with the lower stability. For our data set, this could mean that the persistent correlation of job attitudes and subsequent performance indicators may partly be explained by the higher stabilities in the performance variables. However, the statistical method developed by Steiger (1980) applied in this study accounts for the potential effect of stabilities by including those correlations in the formula.

Third, we would like to mention that mean business unit level climate scores may not always be adequately representing group level constructs based on individual survey data (see Croon & van Veldhoven, 2007). However, we calculated the commonly applied aggregation statistics to ensure the aggregation of individual-level data could be justified and results for all indicators were satisfactory.

Finally, we would like to mention that the interpretation of causal direction based on significance tests has its limits. Specifically, as some of the correlations we found have confidence intervals that overlap, and due to the small sample size (low power), the interpretation needs to be done cautiously. However, the findings are directionally consistent with prior meta-analyses and recent studies on the business unit level that suggested the same causal direction.

We encourage future studies that gather longitudinal business unit data with at least two-wave data sets and, whenever possible, various sources of data. Otherwise, inferences of likely causal priority are very difficult to make. With an average sample size of 34 business units, our sample size is relatively small (albeit based on data of around 750 individuals over 4 years). Future studies should gather larger data sets, which would lead not only to smaller confidence intervals for the effects described, but also to a likely shift from the cross-lagged panel correlation techniques to more advanced methods such as hierarchical linear modeling (Bryk & Raudenbush, 1992) or longitudinal growth models (Singer & Willett, 2003) – an analytic strategy that our data did not allow.

Because the endowment/contrast model (Cheng, 2004; Tversky & Griffin, 1991) suggests that any pleasant stimulus reduces the pleasure associated with subsequent stimuli of the same kind (i.e., internal and external rewards), we suggest to align the measurement intervals along the specific organizational setting in which the measurement takes place. Based on the organization's systems time cycle (Mitchell & James, 2001), which is usually the economic year, the points in time for measurement should be carefully considered. In other words, based on our theoretical framework, we suggest that that measurement should take place in alignment with the moments in time where internal or external rewards are being made available.

Conclusions

This study extends prior work on the relationship between job attitudes and business outcomes by introducing a theoretical framework to explain timing differences on the effect of job attitudes on business unit performance and by exploring issues of likely causal ordering based on a four-wave data set. The results provide positive support for job attitudes as persistent predictors of business unit financial performance and customer satisfaction for time lags of 1–3 years, whereas the effect of performance on job attitudes diminishes after 1 year. Therefore, the results show that employees' job attitudes are an important driver of both business unit financial performance and customer satisfaction. Nevertheless, carefully designed research is needed in the future to provide further conceptual clarification of the underlying mechanisms of these relationships, as a variety of potential moderators and mediators of the relationship between job attitudes and performance may exist.

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