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Group Absenteeism and Positive Affective Tone:
A longitudinal study

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Abstract

This study investigates temporal variation in group absence behavior, and the relationship between group absenteeism and the group's positive affective tone. Absenteeism data were obtained from 97 work groups, aggregated over each of the four quarters of a year. The group's positive affective tone was measured through two employee opinion surveys. Multi-level regression analyses were carried out, in which linear, quadratic, and cubic change trends were tested as predictors of change over time in group absenteeism. All three change trends explained unique variance in the group absenteeism data, indicating that the level of group absenteeism changes over time. We also found that there was significant variation between groups in the strength and direction of the linear and quadratic change trends. Positive affective tone was negatively related to the level of group absenteeism, and change in positive affective tone predicted the strength and direction of the linear change trend for group absenteeism.

Keywords: Absenteeism, groups, positive affect, change, temporal.

Group Absenteeism and Positive Affective Tone: A longitudinal study

In this study we investigated temporal variation in group absence behavior over a one year period. Because previous studies of temporal change in absenteeism have been conducted at the individual or organizational level of analysis, we investigated whether the pattern of change over time in group absenteeism was consistent for groups operating within the same organization, or whether groups varied in their pattern of change over time. Using multi-level analyses, we also investigated the relationship between positive affective tone and group absenteeism, and the extent to which linear change in group absenteeism could be predicted from change in a group's positive affective tone.

Absenteeism represents a significant cost to organizations. The direct cost of absenteeism to organizations has been estimated in terms of millions (Dansereau, Alutto, & Markham, 1978; Doherty, 1979; Dunn & Youngblood, 1986) and even billions (Dalton & Mesch, 1991; Lu, 1999) of dollars. There are also indirect costs, such as those associated with hiring casual staff to replace absent employees, or delays to schedules resulting from loss of work hours (Dansereau et al., 1978). The high cost of absenteeism is therefore one reason for seeking to better understand absence behavior. However, the importance of absenteeism to organizations extends beyond its effect on the bottom line. Longitudinal research suggests that absenteeism

leads to lower job satisfaction (Clegg, 1983; Tharenou, 1993) and performance (Tharenou, 1993), and that high absenteeism can be a precursor of turnover (Griffeth, Hom, & Gaertner, 2000; Mitra, Jenkins, & Gupta, 1992). The mean level of absenteeism within a group has also been found to be strongly correlated with work group climate (Hiller & Vance, 2001), suggesting that absenteeism may serve as an indicator of organizational viability (Steers & Rhodes, 1978).

In this study, we investigated absenteeism from a multi-level perspective, in order to determine (a) whether there was significant change in group absenteeism over time; (b) whether groups varied in their pattern of change over time; and (c) whether differences between groups, both in their mean level of absenteeism at a given point in time, and the amount of linear change over time, are related to the positive affective tone of the group. Existing research has demonstrated that organizational levels of absenteeism vary significantly over time (Dansereau et al., 1978; Harrison & Shaffer, 1994; Leonard, Dolan, & Arsenault, 1990; Markham, Dansereau, & Alutto, 1982). We also know that absenteeism exhibits significant group-level variance (Markham & McKee, 1995; Mathieu & Kohler, 1990; Terborg, Lee, Smith, Davis, & Turbin, 1982). However, to date, there has been no published research looking at how group absenteeism changes over time, and more importantly, whether group-level factors can explain change in absenteeism. Within organizations, financial and HR data, including absenteeism, are often reported at the group- and organizational-level. Managers tend to be concerned about the level of absenteeism across the organization as a whole, and within the group or groups that they are responsible for. There are also ethical and legal reasons why managers are likely to be cautious about addressing an individual's absenteeism behavior. Therefore, research that provides information about the dynamics of group absenteeism is likely to be relevant for practitioners.

<u>Investigating Absenteeism at the Group-level of Analysis</u>

There is evidence to suggest that absence behavior is affected by group-level processes. Terborg, Lee, Smith, Davis and Turbin (1982) found that different retail stores, within a single company, experienced significantly different levels of absence. Markham and McKee (1995) replicated this finding, and in addition, found that groups varied in terms of what they considered "acceptable" levels of absenteeism.

The group-level variance in absenteeism has been attributed to the effect of 'absenteeism norms' that are assumed to influence individual behavior (Johns, 1997). In part, absenteeism norms are thought to arise because employees do not wish to be identified as having a high level of absenteeism. Consequently, employees look to their co-workers in order to determine what is an appropriate level of absenteeism (Chadwick-Jones, Nicholson, & Brown, 1982). This theory is supported by empirical research that shows an individual's level of sick leave can be predicted on the basis of his or her estimate of what the average level of absenteeism is within his or her group (Gellatly, 1995; Harrison & Shaffer, 1994), and on the basis of the actual level of absence within the group (Mathieu & Kohler, 1990). Another reason for the development of group absenteeism norms is the fact that a group member's absenteeism may have negative repercussions for the other group members. For instance, when one group member decides to be absent from work it may increase the workload for the remaining group members. This interdependence means that absenteeism is likely to be subject to social influence, dictating how much absence is acceptable, and on what occasions absenteeism is justified (Chadwick-Jones et al., 1982; Hiller & Vance, 2001). Consistent with this view, Markham and McKee (1995) found that group members' ratings of what their manager and other group members

would consider acceptable levels of absence were correlated with the group's absence frequency.

On the basis of existing research supporting the presence of group-level variance in absence data, we predicted that:

H_1: Groups will differ significantly in their mean level of absenteeism

Investigating Absenteeism Over Time

Although absenteeism has been investigated at the group–level before, in this study we look at how group absenteeism changes over time. Thus far, studies of change over time in absenteeism have focused on the organizational-level. Researchers have demonstrated variability in organizational absenteeism associated with days of the week, (Dansereau et al., 1978; Markham et al., 1982), the season (Harrison & Shaffer, 1994; Leonard et al., 1990; Markham et al., 1982), and significant change from year to year (Dansereau et al., 1978; Leonard et al., 1990; Markham et al., 1982). However, there does not appear to be any research investigating change in absenteeism at the group-level.

It is possible that the pattern of change in organizational-level absenteeism that has been reported by researchers (Dansereau et al., 1978; Harrison & Shaffer, 1994; Leonard et al., 1990; Markham et al., 1982) masks a range of different change patterns for individual groups. Typically, researchers investigate linear, quadratic, and cubic change trends (Hofmann, Jacobs, & Baratta, 1993; Hofmann, Jacobs, & Gerras, 1992; Ployhart & Hakel, 1998), as these represent the three most basic change functions, and the substantive interpretation of trends beyond cubic ones is difficult (Hofmann et al., 1992). Each of these functions might be found in group absence data. We use three variables that are known to have an effect on absence behavior to illustrate how each of these change trends might occur.

First, the relationship between absence behavior and economic and market conditions (Markham, 1985) might create linear change trends in group absence data. If absence behavior is linearly related to the unemployment rate, a downturn in the economy should lead to a linear decrease in absenteeism. The financial performance of the organization or group may also have linear effects on group absenteeism. Second, the seasonal effects on absenteeism that have been reported in the literature (Harrison & Shaffer, 1994; Leonard et al., 1990; Markham et al., 1982) should create a quadratic trend in the data, for instance, as absenteeism increases going into winter and then decreases as the weather becomes warmer again. Finally, workload demands have been found to have a negative effect on absenteeism (Parkes, 1982; Smulders & Nijhuis, 1999). The effect of workload could create a cubic change trend in group absenteeism. For example, groups that work on short-term projects might show a decrease in absenteeism when they begin a project, then an increase in absenteeism when the project is wound up (as group members take leave to recover from the pressure of work), followed by another decrease when they begin a new project. In this study, we tested for linear, quadratic, and cubic patterns of change over time, allowing for the possibility that each group might exhibit different patterns of change over time. Our second hypothesis was that:

H_2: Levels of absenteeism in groups will vary systematically over time

Group Absenteeism and Positive Affective Tone

If groups show different patterns of change over time, such that the rank order of groups change, factors that initially predicted differences between groups in their level of absenteeism might not do so once the rank order of groups has changed. The third focus of this paper was, therefore, to investigate whether we would observe

consistency over time in the relationships associated with group absenteeism. We focused on the relationship between group absenteeism and positive affective tone.

Group affective tone represents the consistent or homogeneous affective reactions within a group (George, 1990, 1996). Two dimensions of group affective tone have been identified: positive affective tone and negative affective tone (George, 1990, 1996). Research shows that the two dimensions of affect emerge as independent factors (Organ & Near, 1985; Watson & Tellegen, 1985) and display independent patterns of relationships with other variables (Costa & McCrae, 1980; Warr, Barter, & Brownbridge, 1983; Watson & Clark, 1984). We focused on the relationship between positive affective tone and absenteeism, because current research findings provide more support for this relationship than for a relationship between negative affective tone and group absenteeism (George, 1989, 1990; Hiller & Vance, 2001; Pelled & Xin, 1999).

There are several mechanisms through which the relationship between positive affective tone and group absenteeism might operate. George (1990; 1996) argues that the positive affective tone drives absenteeism behavior because the level of positive affective tone in the work group affects group members' experience of work (George, 1990), and thus, their motivation to come to work (Steers & Rhodes, 1978). When the group has low positive affective tone, employees engage in a higher level of absence behavior as a means of controlling and managing their reactions to the negative environment within the group. Alternatively, the relationship may operate in the reverse direction, such that group absenteeism affects the level of positive affective tone within the group. The decision by one group member to be absent from work may increase the workload of the remaining work group members, or, when task interdependence is high, prevent the other group members from completing their own work. When the whole group has a high level of absenteeism, the cumulative effect of these absences would increase work strain for group members, interfere with group performance, and perhaps even have a negative impact on relationships between group members. Any of these factors would be expected to lower the positive affective tone of the group. A third possibility is that the relationship between positive affective tone and group absenteeism is mediated by group absenteeism norms. That is, a group that is energetic and positive should be more likely to endorse a low level of absenteeism, whereas a group that is low in energy and enthusism may be more tolerant of absenteeism. These norms then drive absence behavior within the group.

The existing research findings provide grounds for predicting that positive affective tone will be negatively related to the level of absenteeism within the group, and that change in positive affective tone should be associated with change in absenteeism. Consequently, we predicted:

H_3: Group positive affective tone will be negatively related to the level of absenteeism within the group

H_4: The relationship between group positive affective tone and group absenteeism should remain significant over time

H_5: Change in a group's positive affective tone should be related to change in group absenteeism

To test our hypotheses, we collected data on group absenteeism over four quarters of a year. Therefore, the measure of time was nested within groups. Nested data are best analysed using multilevel analytical procedures, where time is treated as the level-1 variable, and group is treated as the level-2 variable. The analysis tests whether there is variability between groups in the strength and direction of change

over time, and also tests other variables as predictors of variability between groups in their pattern of change over time.

Context of the Study	
National	Queensland, Australia is known for its temperate climate and outdoor lifestyle. Both of these factors may reduce seasonal variation in absenteeism, as vulnerability to infection and the spread of infection are likely to be reduced. Culturally, Australia has a background of strong unionisation and high minimum wages. Furthermore, at the time of data collection, the economy was strong and employment opportunities were fairly good. The combination of these factors meant that there were not strong institutional or economic pressures on employees to avoid absenteeism. Consequently, there was potential for social influence and group norms to influence employees' absence standards and decisions.
The Organization	The organization operated in the public sector. Two years earlier, a very charismatic leader had been brought in to revitalise the organization. This leader (who left during the period in which the study was conducted) was seen as responsible for changing the organizational culture, by actively encouraging leadership, innovation, competition, and rewarding performance. The organization had also been re-structured, with the result that one section of the organization was expected to compete with the private sector for tenders, while the other section of the organization was responsible for managing the tender process and contracts. Both the culture change and the organizational restructure brought with it greater diversity in work ethics and attitudes. This diversity may have created relatively high between-group variance in our data. We learnt that some groups felt disenfranchised and threatened by these changes. It is possible that they may have used absenteeism as a strategy for coping with work stress.
The Participants	The employees were unionised and many had worked in the public sector for most of their working lives. Their union contract permitted employees to take 10 sick days a year on full pay, but employees were required to provide a medical certificate for periods of sick leave lasting for more than two days. Furthermore, employees classified as public service officers were able to accrue time off when they worked beyond the standard 36.25 hours a week. Non-public service officers worked a 38 hour week. Although non-public service officers were not entitled to accrued time, they were more likely to work overtime, and they had the option of either being paid for overtime hours, or obtaining "time in lieu" for overtime hours. The participants came from all levels of the organization and a variety of different occupational groups, including managers, engineers, and road construction workers. While the range of occupational groups and levels represented in the sample is good for the generalizability of the findings reported here, it should also be noted that these conditions may have further contributed to

	between-group variance in our data, resulting in stronger findings than if we had investigated a more homogeneous sample.
Morale	The level of morale in the organization had increased slightly in the year before this study was conducted, perhaps in response to the changes instituted by the new leader. However, the level of morale remained comparable to that of other public sector agencies operating in the area.
Comment	In combination, the above factors meant that this organization provided a good sample for investigating group-level effects. The employees came from a range of professional groups, and within the organization, conditions and attitudes varied considerably. The prevailing economic environment, combined with the fact that the organization operated in the public sector and employees were highly unionised, should have given employees a sense of discretion as to whether or not to use their allocated sick leave days. This situation, combined with the fact that some employees felt disenfranchised by recent changes, may have led to high levels of absenteeism. However, this tendency may have been counterbalanced by the recent culture change (which rewarded productivity), and the organization's flexible work hours scheme.

Method

Participants

Participants worked for an Australian state government agency comprising approximately 4,600 employees. Employees worked in groups that were responsible for diverse tasks, ranging from construction to administration. Therefore, groups consisted of a variety of professional, administrative, and trade occupations. Rousseau & Fried (2001) emphasized the importance of contextual factors such as country, culture, job type, type of firm, and economic conditions, which may change the meaning of constructs and the nature of relationships observed in the study. We provide an overview of these factors and how they may have affected absence behavior in this organization in the contextual sidebar. The range of professional groups represented in the sample should improve the generalizability of our findings, but, combined with the cultural change and organizational restructure, may have meant that the proportion of group-level variance observed in this organization was relatively high.

Positive affective tone was measured from employee opinion surveys. Three thousand three hundred and thirty five respondents completed the first survey (response rate of 73%) and 3,314 respondents completed the second survey (response rate of 72%). The mean age category of respondents was 36 – 40 years, and 78% of respondents were male. In total, absenteeism data and measures of positive affective tone were collected from 169 work groups. The groups identified by the organization ranged in size from three to 189 employees ($\underline{M} = 20.37$, $\underline{SD} = 18.63$), but the analyses reported here are only based on data from groups consisting of 30 or fewer employees, as we explain in the section on data screening.

Procedure

The study was conducted over a 15-month period. Within this time period the organization conducted its annual employee opinion survey twice, and this provided the two measures of positive affective tone. The first survey was administered in July, and the first quarter of absence data corresponded to the following quarter (from

October to December). The second survey was administered in June of the following year (in the period corresponding to the third quarter of absence data) and the fourth quarter of absence data was collected in the period from July to September.

The survey was distributed to participants in work groups, and survey collection officers located in each work group were responsible for collecting surveys and ensuring that the participant's work group membership was identified. No individual-level identification codes were used with the survey.

Measures

Measures of absenteeism were obtained from a centralized human resources reporting system. The report included both certified and uncertified sick leave, but did not include leave associated with an injury or illness that entitled employees to workers compensation. The reporting system measures absenteeism in days, multiplied by 100. To obtain an absenteeism score for each group, we summed this figure for all employees in the work group and then divided this sum by the number of employees in each group. We divided this mean score by 100. The absenteeism scores therefore represented the average number of days absent for each group, over one quarter of the year.

Positive affective tone was assessed in the surveys using five items from the Queensland Public Agency Staff Survey (Hart, Griffin, Wearing, & Cooper, 1996). These items assess the degree to which the work group goes about its work with enthusiasm, has good team spirit, a lot of energy, high morale, and takes pride in itself as a group. An example item was, 'There is a lot of energy in my work unit/jobsite'. Responses to the items were made on 5-point scales, ranging from 'strongly disagree' to 'strongly agree'. Internal reliability was .88 for the first survey and .89 for the second survey.

Data on the age and gender of group members, and the size of the group, were obtained from the organization's human resources reporting system.

Analyses

We investigated change over time in group absenteeism by testing the ability of three types of change trends to explain the temporal variance in group absenteeism data. The three change trends were represented by orthogonal polynomials, so that each change trend explained unique variance.

The analyses were performed using a multi-level approach, through Hierarchical Linear Modeling (HLM; Bryk, Raudenbush, & Congdon, 1994). The HLM procedure was employed because it is able to deal with the non-independence of observations that is typically associated with grouped data. HLM also is able to deal with the possibility that relationships among variables may vary in strength (and direction), from one group to another. HLM estimates between-group variation in the slope of the relationship between predictors and outcomes. If there is reliable between-group variance in the estimated intercepts or slopes, group-level variables can then be tested as predictors of this 'level-2' variance. The measures of absenteeism represent a time series and are likely to be autocorrelated because error at one time might be related to error at a later time. We conducted all analyses with and without estimation of autocorrelation, and the results remained substantially the same in all cases. We report the results without autocorrelation throughout the paper.

Data Screening

Before aggregating the data to the group-level, we checked the level of within-group agreement for the ratings of positive affective tone. James, Demaree, and Wolf's (James, Demaree, & Wolf, 1984, 1993) $rwg_{(j)}$ statistic was used to assess the level of within-group agreement. The measure of positive affective tone was

associated with a mean $rwg_{(j)}$ value of .85 (SD = .12) in the first survey, and a mean $rwg_{(j)}$ of .85 (SD = .13) in the second survey, indicating that group members displayed high agreement in their ratings of positive affective tone. The level of between-group variance associated with this measure was assessed by calculating the intraclass correlation (ICC(1)). The intraclass correlation for positive affective tone was .21 for the 1999 survey data, and .22 for the 2000 survey data, indicating that approximately 20% of the variance in ratings of positive affective tone was between-group variance. This value is high relative to the median value of .12 that has been reported for group-level constructs in other studies (James, 1982). The reliability of the measure of positive affective tone (ICC(2)) was estimated as 0.69 from the first survey and 0.74 from the second survey. As the rwg(j) values and intraclass correlations indicated that ratings of positive affective tone were associated with high within-group agreement and between-group variance, we determined that it was appropriate to aggregate the measure of positive affective tone to the group-level. The absenteeism data were also aggregated to the group-level, so all analyses were based on aggregated data.

One group was deleted from the data set because two members were absent for a whole quarter. We also deleted groups if they were not represented in the absenteeism or survey data for all four quarters (these groups were not represented across all four quarters because there were changes to the organizational structure). Finally, groups consisting of more than 30 employees tend to split into subgroups (Jewell & Reitz, 1981) and do not provide a representative picture of group-level effects. We therefore chose to restrict our analyses to groups consisting of thirty or fewer group members. Our analyses were therefore based on data from 97 work groups, ranging in size from 3 to 30 employees. The mean group size was 15.58 members (SD = 7.80). The age and gender distribution within this reduced sample was representative of the original full data set.

Results

Does the Level of Absenteeism Vary Between Groups?

The first step in analysing the data was to calculate the intraclass correlation (ICC(1)) for the absence data. The intraclass correlation reveals the proportion of the variance in the absenteeism data due to differences between groups, and the proportion of variance due to change over time. The intraclass correlation for the absence data was .24, indicating that 24% of the variance in absenteeism was group-level variance, and 76% of the variance in absenteeism reflected change over time. The associated chi-square test (see Table 2, under the heading 'model 1') was significant, $\chi^2(96) = 214.98$, $p < .001$, indicating that there was significant variation between groups in their mean level of absenteeism, as predicted in hypothesis one.

Does the Level of Group Absenteeism Vary Over Time?

Our second hypothesis was that group absenteeism would vary systematically over time. The first evidence of variability over time comes from the pattern of correlations among the four absenteeism measures (see Table 1). The correlations among the absenteeism measures approximate a simplex pattern, with measures closer together in time generally more strongly correlated than measures that were distant in time from each other. This pattern suggests that the rank order of groups on absenteeism changes over time (Ployhart & Hakel, 1998).

We next tested the extent to which the temporal variance in group absenteeism could be explained by linear, quadratic, and cubic change trends (see Table 2). The linear change trend represents the simplest form of change, so it was tested first. The linear change trend was significant and positive, $\gamma_{10} = 0.09$, $t(96) = 4.70$, $p < .001$, indicating that on average, groups' absenteeism increased over time. This finding

supports hypothesis two, which predicted that group absenteeism would vary significantly over time. To determine how much level-1 variance was explained by the linear trend, we compared the residual level-1 variance associated with this model, to the baseline estimate of level-1 variance obtained from a model with no predictors. The baseline estimate of level-1 variance was 0.69, and the residual level-1 variance (after taking into account the linear trend in the data) was 0.55. The linear change trend therefore accounted for 20% of the temporal variance in groups' absenteeism.

There was significant variation in the strength and direction of the linear trend across groups, $\chi^2(96) = 138.47$, $\underline{p} < .01$. The regression intercepts (groups' predicted level of absenteeism at time 1) and the regression coefficients (the strength and direction of the linear trend in groups' absenteeism data) were negatively correlated, $\underline{r} = -0.39$, indicating that groups with a higher level of absenteeism tended to display a weaker positive linear trend, or even a negative linear trend. This finding might represent regression towards the mean. The reliability coefficient for the linear change trend was .31, indicating that 31% of the observed between-group variance in the linear change trend was systematic (i.e., could be modelled by between-group covariates).

In the next analysis we added the quadratic change trend to the model. The quadratic trend was a significant predictor of variance over time in group absenteeism, $\gamma_{20} = 0.09$, $\underline{t}(96) = 2.27$, $\underline{p} < .05$, and with both the linear and the quadratic trends entered into the model, the residual level-1 variance was reduced to 0.41, which represents a further 21% decrease from the baseline estimate of level-1 variance. Again, groups did vary significantly in the strength and direction of the quadratic trend, $\chi^2(96) = 156.51$, $\underline{p} < .001$, with some groups showing an increase and then a decrease in their level of absenteeism, but most groups showing a decrease and then an increase (in combination with the overall linear change trend). The regression coefficients for the variables representing the linear trend and the quadratic trend were strongly correlated, $\underline{r} = .60$, which meant that an overall increase in absenteeism over time tended to be combined with a trend where absenteeism initially decreased and then increased. However, in groups for which the level of absenteeism decreased over time, this tended to be combined with a tendency for absenteeism to initially increase and then decrease.

The fourth model tested the cubic change trend in combination with the linear change trend. It was not possible to test the three change trends in the one model, because the level-1 analyses had insufficient degrees of freedom (there were only four observations for each group). The cubic change trend was a significant predictor of variance in groups' absence over time, $\gamma_{20} = 0.03$, $\underline{t}(96) = 2.27$, $\underline{p} < .05$, and it explained an additional 2% of the baseline level-1 variance in absence over that explained by the linear trend alone. Unlike the linear trend and the quadratic trend, the HLM estimates for the cubic change parameter (or trend) did not vary significantly between groups, $\chi^2(96) = 69.73$, $\underline{p} > .05$.

These analyses indicate that, on average, change in group absenteeism comprised a combination of linear, quadratic, and cubic effects. Figure 1 shows the "average" regression line for the groups in this study (calculated from the mean level-1 intercept, and the mean regression coefficients for the linear, quadratic, and cubic effects). The second finding is that, underlying this 'average' effect, there was a high degree of variability in the pattern of change over time exhibited by individual groups. In some groups the pattern of change over time is reversed (e.g., some groups showed a decrease in their level of absenteeism over time rather than an increase over time), and in some groups one or more of these change trends was not a significant predictor

of their absenteeism data. The extent of between-group variability in the linear change trend is depicted schematically in Figure 2, where we show the estimated linear trend for five different groups. The bold line in the figure shows the regression equation for the "average" group in our sample, or in other words, the change trend for a group which exhibited the average level of absenteeism in the first quarter of the study, and exhibited the average rate of linear change over the four quarters of the study. The other four lines depict regression equations for four other randomly chosen groups from the study. It is clear from this figure that when we simply report the average pattern of change over time within an organization, we do not obtain a representative picture of the pattern of change occurring within each group.

The Relationship between Positive Affective Tone and Group Absenteeism

Our third hypothesis was that positive affective tone would be negatively related to the level of absenteeism within each group. With the linear change trend in the model, the variability in the level-1 intercepts represents the estimated between-group variability in absenteeism for the first quarter of the year. Therefore, we tested positive affective tone as a predictor of the estimated level-1 intercept variance. Before entering positive affective tone into the model, we took into account the effect of group size, and the average age and gender of group members, by entering these variables into the equation for the level-1 regression intercept (see Table 3). These variables explained 17% of the estimated intercept variance, although only gender was significantly related to group absenteeism in the first quarter, $\gamma_{02} = -0.65$, $\underline{t}(93) = -2.60$, $\underline{p} < .05$. The gender effect was such that absenteeism tended to be higher in groups that consisted of a higher proportion of males. Even with these variables in the equation, there remained significant unexplained between-group variance in first quarter absence, $\chi^2(93) = 149.62$, $\underline{p} < .001$.

We then tested whether positive affective tone explained additional between-group variance in absenteeism in the first quarter. Positive affective tone was entered into the level-2 regression equation predicting the estimated intercept variance, and was a significant predictor, $\gamma_{04} = -0.28$, $\underline{t}(92) = -2.41$, $\underline{p} < .05$. With positive affective tone in the model, the unexplained variance in the estimated intercept variance was reduced to .22, which meant that positive affective tone explained a further 3% of the between-group variance in absenteeism in the first quarter, after controlling for group size, age, and gender. Table 3 summarizes the results of this analysis (under the heading 'model 2').

Is the Relationship Between Positive Affective Tone and Group Absenteeism Consistent Over Time?

Our fourth hypothesis was that the relationship between positive affective tone and group absenteeism would remain significant from one point in time to another. Our second measure of positive affective tone was obtained prior to the fourth quarter of the study. We tested whether this second measure of positive affective tone explained differences between groups in their level of absenteeism in the fourth quarter. To conduct this test we rescaled the linear change trend, so that the estimated intercept variance represented the variance in group's absenteeism in the fourth quarter, rather than variance in group's absenteeism in the first quarter. The slope of this new linear trend was the same as the slope of the original linear trend because it was rescaled by a constant. However, the estimated variability in the intercepts now represented variability between groups in their level of absenteeism in the *fourth* quarter. The results of the analysis based on the rescaled linear change trend are reported in Table 4 ('Model 1').

Before testing the effect of positive affective tone at the fourth quarter, we again entered the control variables into the model. With the effect of age, gender, and group size entered into the model predicting variance in the regression intercepts, the unexplained variance in the estimated intercept variance actually increased from 0.44 to 0.47. This effect can sometimes be observed with HLM, due to the fact that the residuals for the level-1 and level-2 error terms are correlated. As before, the gender composition of the group was a significant predictor of the between-group variance in absenteeism, $\gamma_{02} = -0.65$, $\underline{t}(93) = -2.60$, $\underline{p} < .05$.

In the third model, we added our second survey measure of positive affective tone to the level-2 regression equation for the regression intercepts. We found that the measure of positive affective tone was a significant negative predictor of between-group variation in the fourth quarter, $\gamma_{01} = -0.37$, $\underline{t}(92) = -3.27$, $\underline{p} < .01$. The unexplained variance in the estimated intercept variance was reduced to 0.39, which meant that positive affective tone explained 11% of the estimated between group variance in absenteeism in the fourth quarter.

Is Change in Positive Affective Tone Related to Change in Group Absenteeism?

The final analyses were designed to test whether change in group absenteeism was related to change in positive affective tone (hypothesis five). The linear change trend represents a simple and powerful predictor of change in group absenteeism. We tested whether change in positive affective tone (the difference in each group's positive affective tone scores from the first survey to the second survey) could explain between-group variability in the regression coefficients for the linear change trend.

This hypothesis represents an interaction effect, because we are positing that the strength of the relationship between the linear change trend and group absenteeism will be dependent upon the amount of change in positive affective tone. Consequently, the main effect of positive affective tone had to be incorporated into the model (as a predictor of the level-1 intercepts) before the interaction effect could be tested. As before, the control variables age, gender, and group size were included as predictors in this model. The results of this analysis are reported in Table 5. The main effect of change in positive affective tone was not significant, $\gamma_{04} = -0.12$, $\underline{t}(92) = -0.82$, $\underline{p} > .05$, but the effect of gender was significant, $\gamma_{02} = -0.70$, $\underline{t}(92) = -2.52$, $\underline{p} < .05$.

Before testing change in positive affective tone as a predictor of the regression coefficient for the linear change trend, once again, the control variables (age, gender, and group size) were entered into the equation (see Table 5, Model 2). Gender was a significant predictor of the regression coefficients, $\gamma_{12} = 0.16$, $\underline{t}(93) = 2.03$, $\underline{p} < .05$, but in this instance gender had a positive effect, indicating that groups with more females in them were more likely to show a strong, positive linear change trend. The control variables explained 10% of the estimated variance between groups in the strength and direction of the linear change trend.

In the final analysis (see Table 5, Model 3), change in positive affective tone was found to be a significant predictor of variance in the level–1 HLM parameter estimates, $\gamma_{14} = -0.10$, $\underline{t}(92) = -2.35$, $\underline{p} < .05$, explaining an additional 10% of the variance after the effect of the control variables had been taken into account.

In sum, the analyses investigating the relationship between group absenteeism and positive affective tone found that there was a negative relationship between these two variables, which was robust to changes in the rank order of groups over time. The final analysis revealed that change in the group's positive affective tone predicted the strength and direction of linear change in group absenteeism. Specifically, an increase in positive affective tone tended to be associated with a more negative linear trend in

absenteeism over time, whereas a decrease in positive affective tone tended to be associated with a more positive linear trend in absenteeism over time.

Discussion

This study provides a picture of change in group absenteeism over time. The findings support previous research that has identified systematic group-level variance in absenteeism (Markham & McKee, 1995; Mathieu & Kohler, 1990; Terborg et al., 1982). In our study, group absenteeism also showed systematic temporal variance. We tested a linear, quadratic, and cubic change trend for each group, and found that on average, these functions explained a significant proportion of the variability in group absenteeism over time. However, the strength and direction of these change trends varied for each group.

The level of temporal variation in group absenteeism was high, with 76% of the variance in absenteeism representing change over time. The observed between-group variance in absenteeism has often been cited to support the role of normative social influence factors in determining the level of absenteeism in the workplace (Johns, 1997). However, our findings suggest that if group-level absence behavior is governed by norms, these norms are not impervious to change over time. Furthermore, the finding of group-level variance in absenteeism, combined with changes in group's level of absenteeism over time, suggests that groups represent a point of leverage from which to bring about change in absence behavior.

All of the previous studies investigating temporal change in absenteeism have been conducted at the organizational-level of analysis. We found that the average (or organizational-level) pattern of change over time was not representative of the pattern of change exhibited by most groups in this organization. While some groups exhibited an increase in their level of absenteeism over the one year period, in some groups this increase was large and in other groups this increase was small. Still other groups actually exhibited a decrease in their level of absenteeism. As well as documenting temporal variation in absenteeism, we found that the combination of linear and quadratic change trends explained 41% of the observed temporal variance in absenteeism. The cubic trend did explain a significant proportion of temporal variation, but this effect only explained an additional 2% of the temporal variance in group absenteeism.

Given that groups display different patterns of change over time, there is potential for groups' absenteeism levels to either converge or diverge over time. Over the one year period, there was a divergence in groups' absence levels, which could be seen from the fact that the estimated intercept variance in the fourth quarter (0.44) was almost double the estimated intercept variance in the first quarter (0.27). It may be that over the period in which this study was conducted, the "situational" forces underlying absenteeism became weaker. In their review on the role of context in organizational research, Rousseau and Fried (2001) discussed the idea, formulated by Weick (1996) and Mischel (1977), that the impact of individual predictor variables will depend on whether the situation is weak (such as when the organization is newly formed, or lacks cohesion), or strong (such as when the organizational norms and culture are well established). With regard to our study, the increased group-level variance in absenteeism over time suggests that the contextual factors influencing absenteeism became less strong over time, allowing group-level factors to have greater impact. The change in organizational leadership that occurred when this study was conducted may have been responsible for this effect. The departure of the charismatic leader, who was considered to be responsible for establishing the new organizational culture (see sidebar), and uncertainty about the priorities of the new

leader, may have created a relaxation in organizational norms, thus allowing group-level factors to play a stronger role in driving absenteeism. According to this hypothesis, the effect of positive affective tone should have been stronger in the fourth quarter than in the first quarter. However, due to the fact that the control variables actually created increased residual variance in the fourth quarter analyses, the effect of positive affective tone was evaluated against a different benchmark in the two sets of analyses, so it was not possible to make this determination.

On this point, it is worth commenting on the effect sizes associated with positive affective tone. We found that after controlling for the effect of age, gender, and group size, positive affective tone explained between 3 and 11% of the between group variance in absenteeism. Additionally, the analysis of change in positive affective tone as a predictor of linear change in group absenteeism showed that change in positive affective tone explained 10% of the variance for the linear change trend. Given that the latter effect represents an interaction effect (as change in positive affective tone was used to predict the strength of the relationship between the linear change trend and the absenteeism data), an effect size of 10% is substantial. However, the results of the analyses testing the main effect of positive affective tone suggest that the relationship between positive affective tone and group absenteeism is not very strong. This finding is consistent with research which suggests that physical health, rather than psychological factors, is the best predictor of absence behavior (Goldberg & Waldman, 2000; Hackett, Bycio, & Guion, 1989; Smulders, 1980). Our interest lies in understanding and controlling discretionary absence behavior, as opposed to absence that is due to physical illness. Given that discretionary absence is probably small in relation to total absence, it is understandable that positive affective tone should only explain a small proportion of the total variance in absence behavior.

One unexpected and interesting finding from this study, was the moderately strong correlation between the regression coefficients for the linear change trend and the quadratic change trend (r = .66). When combined with the linear change trend, the quadratic term represents the amount of acceleration or deceleration in absenteeism beyond that captured by a straight linear change trend (Ployhart & Hakel, 1998). The correlation in the linear and quadratic effects indicates that when groups' level of absenteeism was increasing, the quadratic effect tended to take the form of a u-shaped curve, whereas when groups' level of absenteeism was decreasing, the quadratic effect tended to take the form of an n-shaped curve. In other words, changes in group absenteeism (whether they represent an increase or a decrease) tend to accelerate over time.

This finding is consistent with the idea that social influence effects underlie group-level variance in absenteeism. If group members look to one another to determine what is an appropriate level of absenteeism, we would expect change in absenteeism norms to occur slowly at first, as individuals test new behaviors (either less or more absenteeism than is considered normal within the group). Assuming the new behavior does not bring retribution, other members of the group will assimilate this new information about absence behavior within the group, using it to revise their understanding of the absenteeism norm. This new norm will affect their own behavior, with the result that all group members begin to display higher (or lower) levels of absenteeism. The result would be an accelerating pattern of change over time, like that we have observed in this study. This explanation could be tested in a future study by looking at whether the magnitude of the quadratic effect is related to the group's level of cohesion. Social influence effects tend to be stronger in more cohesive groups (Zaccaro, Gualtieri, & Minionis, 1995). Therefore, if social influence

effects are responsible for the quadratic change trend, the magnitude of this change trend should be related to the level of group cohesion.

The temporal variation in group absenteeism did change the rank order of groups. Some groups that, at the outset of the study, exhibited very high absenteeism, actually exhibited relatively low absenteeism by the end of the year. This finding has implications for organizational diagnosis. Information about a group's current level of absenteeism is not particularly useful when current performance does not predict future performance. Instead, it is more useful to be able to identify whether groups are at risk of developing a high level of absenteeism in the future.

The positive affective tone of the group may be an important indicator for group absenteeism. That is, our findings revealed that change in positive affective tone could predict the strength and direction of the linear change in group absenteeism. The groups that showed the greatest improvement in their level of absenteeism were those that showed an increase in their level of positive affective tone. That is, absenteeism tended to decrease in groups that reported that their group had become more energetic and enthusiastic. However, when the level of enthusiasm and energy within the group had decreased, absenteeism tended to show a more positive linear trend. These findings provide yet another reason for managers to monitor and safeguard the affective climate of the groups that they manage. Apart from the fact that the affective tone of the group is likely to be linked to the well-being of group members, decrements in the positive affective tone of the group are likely to be accompanied by increasing absenteeism costs.

Limitations

This study was a correlational study, which meant that it was not possible to ascertain whether positive affective tone was the driver of change in group absenteeism. It is possible that change in group absenteeism results in a change in group positive affective tone, and therefore that it is more useful to look at group absenteeism as an indicator of long-term group viability. Furthermore, if positive affective tone is the driver of group absenteeism, we do not know whether this represents a direct relationship, or whether the effects of positive affective tone on group absenteeism are mediated by the effect of positive affective tone on group absenteeism norms, or alternatively, by the effect of positive affective tone on individual positive affect. Further research is required in order to differentiate between these scenarios.

Second, this study focused on group absenteeism and how it varies over time. We did not measure individual-level variance in absenteeism. If we had, the proportion of time-level and group-level variance would have been smaller, due to the fact that the total variance would also include the individual-level variance in absenteeism. We might also have obtained different estimates of the relative proportion of time-level and group-level variability in absenteeism, depending on whether individual absenteeism is more or less stable over time than group absenteeism. The multi-level approach will incorporate three levels of analysis, so it is possible to model time-level variance, individual-level variance, and group-level variance simultaneously. With such data it would be possible not only to quantify the proportion of time-level, individual-level, and group-level variance, but also to investigate whether individuals within the same group tend to exhibit the same pattern of change over time. Hackett, Bycio, and Guion (1989) found that group-level analyses masked individual-level variation in the pattern of events that correlate with absenteeism. Their findings suggest that group-level temporal patterns may mask unique individual change patterns (in the same way as the organizational-level change

trends are not representative of unique group-level change trends). Furthermore, by obtaining longitudinal individual- and group-level absence data, we could ascertain whether group-level or individual-level characteristics explain the greatest proportion of the variance in absenteeism over time. Such information would be useful in terms of assisting practitioners to determine whether it would be more useful to target absenteeism interventions at the level of the group, or at the level of the individual.

A third limitation relates to control variables. Absence behavior reflects the influence of multiple factors (Muchinsky, 1977; Steers & Rhodes, 1978). In order to obtain an accurate picture of any one factor, it is necessary to control for other factors that are known to have an impact on absenteeism, and that might be correlated with the variable of interest. For this reason, in our analyses testing the effect of positive affective tone, we controlled for the age and gender of group members, and also the size of the group. We might have obtained a clearer picture of the effect of positive affective tone by controlling for additional variables, such as job type, or educational level.

Finally, the data on which this study was based provides a picture of group absenteeism over a one year period. We know from previous research that organizational absenteeism has seasonal variability (Harrison & Shaffer, 1994; Leonard et al., 1990; Markham et al., 1982). The linear trend towards an increase in group absenteeism that was observed in our data may reflect this seasonal effect, because the fourth quarter of data was collected in the winter period, which has been reported as the season associated with the highest level absenteeism (Leonard et al., 1990). Possibly, if we had begun data collection in winter and finished collecting data in summer, the average linear trend in the data would have been negative rather than positive. Alternatively, if the data were collected over a longer time period, the increase in absenteeism associated with the winter quarter may have been followed by a decrease in the summer quarter. Under these circumstances, instead of observing a trend towards a positive linear change trend, we might have observed a stronger quadratic effect. The data from this study does not provide a generalizable description of change in absenteeism over time, because this is likely to depend on the length of time that is observed, and the season/s in which the study is conducted. However, that was not the goal of this study. Our goal was to demonstrate that even though there are discernable seasonal, weekly, and yearly patterns in organizational absenteeism, these organizational-level trends mask a wide range of temporal patterns associated with groups. We were then able to explain some of the variance in groups' temporal patterns through the group characteristic positive affective tone.

Conclusion

Like organizational absenteeism, group absenteeism displays significant variability over time. The group-level variability in absenteeism obviously reflects the effect of different factors than organizational-level variability, since each group experiences the same organizational conditions, and yet displays a unique pattern of change over time. The findings of this study suggest that group characteristics, such as positive affective tone, may play a role in determining both the current level of group absenteeism, and the direction which group absenteeism will take in the future.

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Table 1

Descriptive Statistics and Correlations Among Measures

Measure	N	M	SD	1	2	3	4	5	6	7	8	9
1. Absence Q1	97	0.98	0.87	--								
2. Absence Q2	97	1.11	0.81	.50***	--							
3. Absence Q3	97	1.11	0.84	.19	.34**	--						
4. Absence Q4	97	1.61	1.13	.29**	.17	.24*	--					
5. Positive Affective Tone T1	97	3.47	0.49	-.20	-.29**	-.17	-.15	--				
6. Positive Affective Tone T2	97	3.45	0.48	-.12	-.24*	-.20	-.33**	.63***	--			
7. Change in Positive Affective Tone	97	-.03	0.42	.09	.06	-.03	-.20	-.45**	.41***	--		
8. Age	97	39.54	4.36	.15	-.02	.01	-.09	.07	.18	.13	--	
9. Gender	97	1.25	0.22	-.25*	-.15	-.20	.05	.29**	.10	-.22*	-.11	--
10. Group Size	97	15.58	7.80	.10	.18	.06	.07	-.26*	-.19	.09	.07	.11

*p < .05. **p < .01. ***p < .001.

Table 2
Models investigating the patterns of change in absenteeism

Analysis	Parameter estimate	SE	t-value	Parameter variance	$\chi^2(\underline{df})$
Model 1 (Null)					
Intercept, γ_{00}	1.21	0.06	19.24***	0.21	214.98(96)***
Model 2					
Intercept, γ_{00}	0.92	0.08	11.26***	0.27	163.94(96)***
Linear trend, γ_{10}	0.09	0.02	4.70***	0.01	138.47(96)**
Model 3					
Intercept, γ_{00}	0.92	0.08	11.26***	0.37	221.22(96)***
Linear trend, γ_{10}	0.09	0.02	4.70****	0.02	186.86(96)***
Quadratic trend, γ_{20}	0.09	0.04	2.27*	0.06	156.51(96)***
Model 4					
Intercept, γ_{00}	0.92	0.08	11.26***	0.28	167.47(96)***
Linear trend, γ_{10}	0.09	0.02	4.70***	0.01	141.45(96)**
Cubic trend, γ_{20}	0.03	0.01	2.27*	0.00	69.73(96)

*$\underline{p} < .05$. **$\underline{p} < .01$. ***$\underline{p} < .001$.

Table 3
<u>Investigating the relationship between positive affective tone and group absenteeism at Q1</u>

Analysis	Parameter estimate	<u>SE</u>	$\underline{t}$-value	Parameter variance	$\chi^2(\underline{df})$
<u>Model 1</u> Predicting absenteeism in the first quarter					
Intercept, γ_{00}	1.52	0.81	1.89	0.23	149.62(93)***
Age, γ_{01}	-0.00	0.02	-0.01		
Gender, γ_{02}	-0.65	0.25	-2.60*		
Group size, γ_{03}	0.01	0.01	1.53		
Predicting regression coefficient for linear change trend					
Intercept, γ_{10}	0.09	0.02	4.70***	0.01	138.46(96)**
<u>Model 2</u> Predicting absenteeism in the first quarter					
Intercept, γ_{00}	2.16	0.78	2.79**	0.22	146.59(92)***
Age, γ_{01}	0.00	0.02	0.22		
Gender, γ_{02}	-0.43	0.26	-1.67		
Group size, γ_{03}	0.01	0.01	0.91		
PAT, γ_{04}	-0.28	0.12	-2.41*		
Predicting regression coefficient for linear change trend					
Intercept, γ_{10}	0.09	0.02	4.70***	0.01	138.47(96)**

*$\underline{p} < .05$. **$\underline{p} < .01$. ***$\underline{p} < .001$.

Table 4
Investigating the relationship between positive affective tone and group absenteeism
at Q4

Analysis	Parameter estimate	SE	t-value	Parameter variance	$\chi^2(df)$
Model 1					
Predicting group absenteeism in the fourth quarter					
Intercept, γ_{00}	1.49	0.09	16.22***	0.44	206.18(96)***
Predicting regression coefficient for linear change trend					
Intercept, γ_{10}	0.09	0.02	4.70***	0.01	138.47(96)**
Model 2					
Predicting group absenteeism in the fourth quarter					
Intercept, γ_{00}	2.09	0.82	2.55*	0.47	209.30(93)***
Age, γ_{01}	-0.00	0.02	-0.01		
Gender, γ_{02}	-0.65	0.25	-2.60*		
Group size, γ_{03}	0.01	0.01	1.53		
Predicting regression coefficient for linear change trend					
Intercept, γ_{10}	0.09	0.02	4.70***	0.01	138.48(96)**
Model 3					
Predicting group absenteeism in the fourth quarter					
Intercept, γ_{00}	2.97	0.84	3.54**	0.39	190.17(92)***
Age, γ_{01}	0.01	0.02	0.41		
Gender, γ_{02}	-0.50	0.23	-2.22*		
Group size, γ_{03}	0.01	0.01	1.01		
PAT, γ_{04}	-0.37	0.11	-3.27**		
Predicting regression coefficient for linear change trend					
Intercept, γ_{10}	0.09	0.02	4.70***	0.01	138.45(96)**

*$p < .05$. **$p < .01$. ***$p < .001$.
Note. PAT = Positive affective tone.

Table 5
Investigating change in positive affective tone as a predictor of the linear change trend

Analysis	Parameter estimate	SE	t-value	Parameter variance	$\chi^2(\underline{df})$
Model 1					
Predicting group absenteeism in the first quarter					
Intercept, γ_{00}	1.54	0.81	1.90	.24	151.59(92)***
Age, γ_{01}	0.00	0.02	0.04		
Gender, γ_{02}	-0.70	0.28	-2.52*		
Group size, γ_{03}	0.01	0.01	1.55		
Change in PAT, γ_{04}	-0.12	0.15	-0.82		
Predicting the regression coefficient for the linear change trend					
Intercept, γ_{10}	0.09	0.02	4.70***	.01	138.47(96)**
Model 2					
Predicting group absenteeism in the first quarter					
Intercept, γ_{00}	1.31	1.19	1.10	0.23	147.74(92)***
Age, γ_{01}	0.02	0.03	0.70		
Gender, γ_{02}	-1.11	0.34	-3.26**		
Group size, γ_{03}	0.02	0.01	1.30		
Change in PAT, γ_{04}	-0.12	0.15	-0.82		
Predicting the regression coefficient for the linear change trend					
Intercept, γ_{10}	0.19	0.25	0.74	0.01	130.07(93)**
Age, γ_{11}	-0.01	0.01	-1.23		
Gender, γ_{12}	0.16	0.08	2.03*		
Group size, γ_{13}	-0.00	0.00	-0.25		
Model 3					
Predicting group absenteeism in the first quarter					
Intercept, γ_{00}	1.29	1.17	1.10	0.22	145.27(92)**
Age, γ_{01}	0.02	0.03	0.64		
Gender, γ_{02}	-1.00	0.34	-2.91**		
Group size, γ_{03}	0.02	0.01	1.19		
Change in PAT, γ_{04}	0.12	0.17	0.71		
Predicting the regression coefficient for the linear change trend					
Intercept, γ_{10}	0.19	0.24	0.80	0.01	124.83(92)*
Age, γ_{11}	-0.01	0.01	-1.14		
Gender, γ_{12}	0.12	0.08	1.48		
Group size, γ_{13}	-0.00	0.00	-0.08		
Change in PAT, γ_{14}	-0.10	0.04	-2.35*		

*$\underline{p}$ < .05. **$\underline{p}$ < .01. ***$\underline{p}$ < .001.
Note. PAT = Positive affective tone.

Figure 1
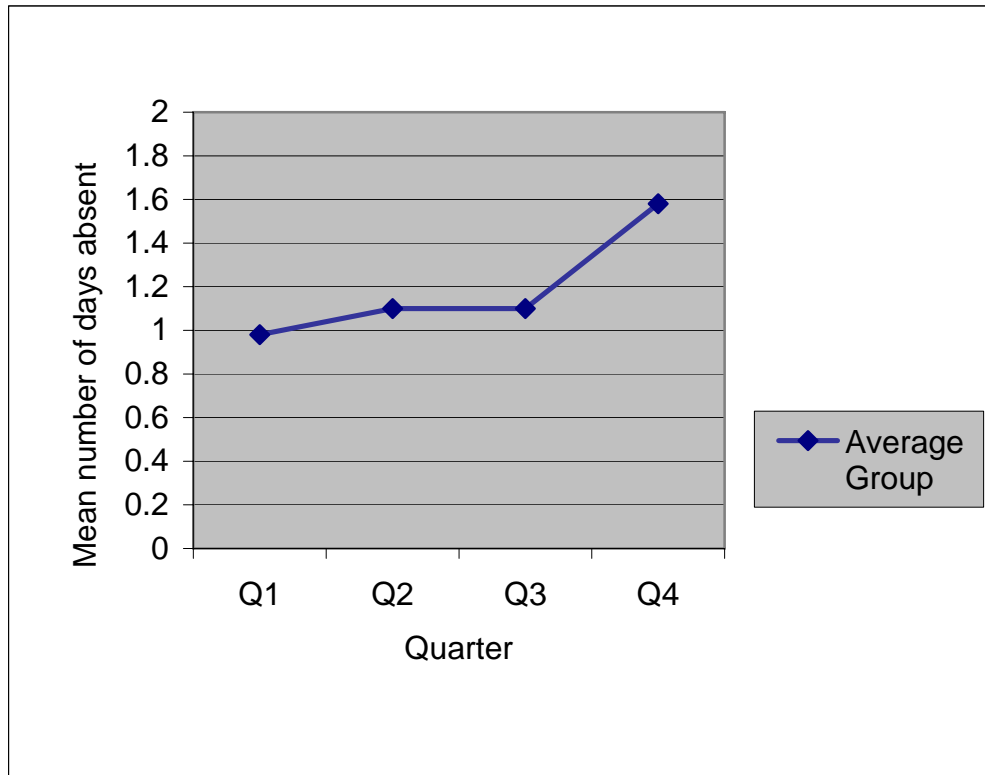Representing the combined average linear, quadratic, and cubic effects

Figure 2
Observed variability in groups' linear change trends