Transformational leadership and innovation in an R&D organization experiencing major change

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Abstract

Purpose – The purpose of this paper is to add to the understanding of how transformational leaders influence R&D team outcomes around being more innovative. In particular, the study aims to focus on the role of group identification in mediating innovative outcomes.

Design/methodology/approach – In total, 104 participants in a large Australian R&D organization were surveyed twice during a 12 month period of major restructuring and change. These matched respondents came from 29 different teams.

Findings – Results revealed that group identification and perceived support for creativity exerted equal independent effects in fully mediating the relationship between transformational leadership and team innovation.

Research limitations/implications – The potential for leadership to influence innovation through identification raises interesting alternative possibilities. Future research may generate new insights by investigating alternative samples, leadership styles or using qualitative methods.

Practical implications – Findings point to how a more transformational style of leadership influences team climate and identification, and in turn innovation in the context of scientific R&D teams. Such styles do produce better outcomes, both for the organization around more innovative products and processes, but also for team members who engage in more creative team environments.

Originality/value – These findings add to the conceptual understanding of processes through which transformational styles of leadership promote innovation, and highlight the benefits gained by promoting more transformational styles of leadership to generate more innovative outcomes from teams and employees.

Keywords Innovation, Transformational leadership, Employees behaviour, Team working, Identification, Climate, Australia, Organizations, Change management

Paper type Research paper

Introduction

Sustained competitive advantage in business is contingent on continued innovation in processes, products and services (Jung et al., 2003; Mumford, 2003). As such, academics and practitioners have shown a great deal of interest in identifying the factors that
promote and sustain innovation in organisations (Damanpour and Schneider, 2006). One important line of research focuses on the growing recognition of the role of teams and their leaders in fostering and sustaining innovation in firms. However, relatively few studies investigate the processes that team leaders employ in driving innovation (Eisenbeiss et al., 2008), resulting in numerous calls for more research, especially into the factors and processes that explain how leaders influence and sustain higher levels of innovation in their teams (e.g. Avolio and Yammarino, 2002; Hunt and Conger, 1999). Moreover, little is known about how these factors and processes might operate during times of large scale and turbulent organisational change. In such contexts, team leaders are attempting to promote or continue high levels of innovation in their teams, but in an environment of uncertainty and disruption that might not help their efforts.

In the current study, we aim to address these gaps in our understanding of leadership, teams, innovation and major change by examining the team leader’s role in shaping how employees identify with their work groups, and how this level of identification influences perceptions of innovation in an R&D organisation experiencing considerable turbulence around a major restructuring. The current study adds to emerging conceptualisations around the relationship between leadership, teams, change and identification processes (Walumbwa et al., 2008), with growing evidence for the positive effects in promoting employee identification with the organisation (Hulsheger et al., 2009), and employees’ identification with their work unit (e.g. Riketta and van Dick, 2005; van Knippenberg and van Schie, 2000).

In addition, the current study explores how leaders might promote a climate for creativity that influences more innovative outcomes from their work groups despite what is occurring around them in terms of large scale change. While researchers originally assessed climate at the organisational level, it has since been argued that perceptions of team climate may be even more salient for team members (Tesluk et al., 1999). While the organisational climate is likely to shape teams’ outputs in a broad sense, assessing individual team members’ perceptions of support for creativity might provide even better insights into why teams undergoing major change and re-structuring might differ in their levels of effort to be innovative. Finally, the current study is one of only a few studies that follows over time the emergence of new team leaders and the teams, and that examines the critical first year in which leaders and team members work together.

Literature review
The role of transformational leaders
Transformational leadership theory focuses on the significant role that leaders can play in promoting both personal and organisational change, and the role of leaders in assisting employees to meet and exceed expectations about performance (Avolio, 2005). However, transformational theories of leadership are not without criticism. The theories are not clear on how leaders shape group and organisational processes, while there is little attention to task-oriented behaviours and processes such as how leaders clarify their expectations, set goals and monitor the performance of their staff (Yukl, 2009; see also Burke et al., 2006). Also these theories are criticised for not considering the importance of contextual and situational influences on leaders’ behaviours (Hunt, 2005) and the role of followers (or team members) in shaping the leaders’ transformational behaviours (Dvir and Shamir, 2003).
Despite these criticisms, transformational leadership still presents one of the most widely accepted and supported approaches to leadership at the current time (Hunt, 2005). As proposed in various conceptual frameworks, transformational leadership and team innovation are related (e.g. Avolio, 1994; Bass and Riggio, 2006; García-Morales et al., 2008). For instance, transformational leadership theorists (e.g. Bass, 1985) propose that such leaders display creative behaviours, serving as role models for innovation. In addition, they provide intellectual stimulation that might encourage followers to think differently (Jung et al., 2003), and they challenge followers to question existing assumptions and working methods which in turn should enhance team innovation (Bass, 1985). However, despite this rich level of conceptual work, relatively few empirical studies have investigated the relationship between transformational leadership and team innovation. Nor is much known about how transformational leaders build the efforts of team members to be innovative under the contextual and situational influences of large scale and disruptive organisational change.

Turning more specifically to prior work on R&D firms, research reveals that team leaders play a vital role in maximizing the benefits to R&D projects through exploiting the interdependence between team members, as well as accessing and sharing the diverse and highly specialised sets of knowledge and skills of those in their R&D teams (e.g. Gillespie and Mann, 2004). However, as García-Morales et al. (2008) point out, we do not have a detailed understanding of how the transformational leader actually promotes processes through which he or she exerts positive influences on their followers (see also Hunt, 2005). Prior research into R&D environments reveals that employees look for opportunities that stimulate them intellectually and support their need to be creative (Herzog, 2008; Sauermann and Cohen, 2008). By providing a vision about creative and innovative outcomes, and promoting intellectual stimulation, transformational leaders are more likely to challenge and inspire individuals to test existing mind sets in order to bring about change (Bass and Riggio, 2006; Eisenbeiss et al., 2008). Transformational leaders also lead by example, modelling creative and unconventional behaviours that may stimulate innovation (Bass and Riggio, 2006). In addition, transformational leaders treat followers as individuals, considering their particular needs and mentoring them appropriately (Bass, 1985).

Interestingly, the limited prior research shows mixed results. Eisenbeiss et al. (2008) found that more transformational leadership was positively related to support for innovation in R&D teams. On the other hand, in a longitudinal study in a health care setting, Wilson-Evered et al. (2001) found no relationship between transformational leadership and team innovation. However, on the basis of the theoretical arguments about the influence of transformational styles of leadership (Avolio, 1994; Bass, 1985), and the balance of empirical findings on studies of leadership and innovation, the following relationship is predicted:

**H1.** Higher ratings of transformational leadership are associated with higher ratings of efforts to be innovative as reported by individual R&D team members.

*Identification with the team*

Ashforth et al. (2008) argue that identification matters because it is a process by which people come to define who they are, and individuals use this self-definition to navigate their personal and work lives. Identification with a team refers to the sense of belonging to the team by individual team members and the extent to which individuals experience...
the team’s successes and failures as their own (Mael and Ashforth, 1992). When people identify highly with the group, they experience the collective’s interests as their own self-interest (van Knippenberg et al., 2004). In their experimental study, Brewer and Kramer (1986) found that highly identified individuals are more willing to limit their own personal gain for the good of the collective. Also strong levels of identification by individuals increase positive perceptions of the group (Tajfel, 1982) and increase team members’ motivation and willingness to co-operate with others (Kark and Shamir, 2002).

However, there is limited conceptualisation and research into the relationship between levels of identification by individuals with their team, team outputs, and innovation. If team members value their team membership as part of their sense of self, team members should be more likely to work towards achieving the goals of the team. In R&D teams, where the goal is often to develop and prove new products and services, innovation can be assumed to be a primary goal of such teams (e.g. see Thamhain, 2003). As such, the following prediction is made.

**H2a.** Stronger identification with the R&D team by individuals is linked to higher levels of reported efforts to be innovative.

As Ashforth et al. (2008) note in their review, interest in the connection between identification and leadership has burgeoned. This prior research reveals numerous outcomes linked to the promotion of identification including more cooperation, effort, information sharing, more coordinated action and task performance (Ashforth et al., 2008; Grice et al., 2006). There is evidence that leaders in particular who emphasize the interest of the group also raise employees’ identification with, and willingness to contribute to the group (Shamir et al., 2000). In testing this notion, Kark et al. (2003) found a positive relationship between transformational leadership and identification with the group. Furthermore, Walumbwa et al. (2008) report that transformational leadership is positively related to identification with the work unit and that a higher level of identification is linked to higher individual performance. Based on these findings, we make the following prediction:

**H2b.** Transformational leadership is associated with greater identification by individuals with the R&D team.

The effectiveness of transformational leadership seems to be at least partly due to its role in increasing individuals’ identification with the group (van Knippenberg et al., 2004). Some prior research (e.g. Paulsen et al., 2009) identifies links between charismatic leadership and more identification by individuals with their research teams, but they found only an indirect effect of identification on outcomes around being innovative. Others report that group identification is likely to reduce individual behaviours that hurt the work group including social loafing, while high identifiers when faced with group threat are more likely to work on behalf of the group’s interests (Ashforth et al., 2008). The scarcity of previous research in this area highlights both the need for further examination, but also some caution in making predictions. Nonetheless, there is a strong case for the role of transformational leadership in fostering identification by individuals with their team (Riketta and Nienaber, 2007; van Knippenberg et al., 2004). Consequently, we make the following prediction:

**H2c.** Identification by individuals with their R&D team mediates the relationship between transformational leadership and efforts to be innovative.
Promoting support for creativity

In their early study of R&D units, Abbey and Dickson (1983) concluded that climate is an important predictor of innovation. Hulsheger et al. (2009) reported that support for innovation was one of the primary predictors of innovation to emerge in their meta-analysis of prior work. Specifically, Amabile (1998) isolated a creativity-conducive environment as one of the critical factors for innovation, suggesting that climate is a key driver for innovation. Therefore, a climate supportive of creativity should allow team members to feel more comfortable in taking risks, trying new things, and exchanging information. This type of climate is more likely to lead to greater involvement in creative processes (Gilson and Shalley, 2004). Also Anderson and West (1998) found that support for innovation emerged as a predictor of overall team innovation, and for reported novelty and number of innovations. Given these findings, we make the following prediction:

H3a. Perceptions by team members of support for creativity will be associated with greater efforts to be innovative as reported by R&D team members.

As noted earlier, by stimulating new ways of examining problems and modelling unconventional behaviours, transformational leaders can encourage a norm of creativity in a climate where there is support for untested methods and where creative outputs are valued. Innovation researchers (e.g. Amabile, 1998; Jung, 2001; Mumford and Gustafson, 1988) propose that leaders can influence followers’ creativity both directly and indirectly. Empirical research confirms this proposition. For example, in a study of 32 Taiwanese companies, Jung et al. (2003) found that transformational leaders not only enhanced organizational innovation directly, but also through the indirect path of a supportive organizational climate for innovation. In addition, Eisenbeiss et al. (2008) found a link between transformational leadership and support for innovation, which in turn fostered team innovation under high levels of climate for excellence. Interestingly, their study recognised the limitations of their cross-sectional design and recommended additional research to explore more causal paths between leadership, climate and innovation. In responding to this call we predicted in this longitudinal study the following:

H3b. Transformational leadership will be associated with perceptions by R&D team members of greater support for creativity.

H3c. Support for creativity will mediate the relationship between transformational leadership and reported levels of effort to be innovative.

Methods

Participants

We conducted our study in a division of a large, publicly-funded R&D organisation that was undergoing major structural and cultural change. This organisation engages in scientific research to deliver innovative solutions for industry and government. Changes included restructuring, downsizing and the formation of new research teams driven by substantial reallocations in Government funding away from scientists pursuing individual projects across a wide range of research areas, to a greater focus on a select number of national key priority areas that required innovative solutions to difficult and persistent national problems (e.g. sustainability of agricultural industries,
improved water management, improved agricultural production through more innovative farm practices). The changes also required the establishment of large-scale multidisciplinary research partnerships, with this overall program being one of the largest scientific research endeavours ever undertaken in the history of the organisation.

The division under study comprised 425 staff across five different locations nationally. In the few months prior to the study, major changes were introduced at the organisational, divisional, and research project levels, which included the creation of the new research teams. Invited by the organisation to study its change processes over this period, we examined over time the development of new teams that were seen to be critical to promoting successful change. A strength of the current study is that comprehensive data were gathered at the beginning when teams were being created and again around 12 months later, thus modifying the potential impacts of common source bias over time. The period of data collection was between 2005 and 2006, and this timing was only one year into the new direction set by the CEO and government for the organisation.

Procedure
The study was conducted in three stages. In the first stage, three executive staff members were interviewed for 90 minutes on average, and 11 focus groups of one to two hours were conducted with staff members from different levels in the organisation to define how innovation was conceptualised. The qualitative data to emerge from this stage are not examined here in detail. However, these data did provide broad support for the conceptual model to be tested, influenced our decisions about the nature of the final survey, and also identified the opportunity to incorporate expert ratings on team performance. In the second stage of the study, questionnaires based on these interviews were delivered to each team member. From the 34 research teams included in the study, a total of 178 members responded to the questionnaire. Only the R&D teams (i.e. no administrative teams) were surveyed. This represented a response rate of 89 per cent of the total number of individuals in these teams.

In the third stage of the study, the same team members completed a second questionnaire approximately 12 months after the first questionnaire. Time 1 and 2 survey measures were highly similar, with the major variables of interest in the current study measured in both surveys. The second survey was completed by 154 members of 30 teams, representing a response rate of 77 per cent. Individual responses from time 1 and time 2 questionnaire data were matched using anonymous codes. There were 104 respondents who completed both time 1 and time 2 questionnaires. These matched respondents came from 29 different teams, each of which had other team members included in the sample. At time 2, the average tenure of these individuals with the organisation was 12 years and 89 per cent of respondents were over 35 years of age. Males accounted for 62 per cent of the sample. There was a high level of education overall, with 55 per cent of respondents holding a PhD degree.

Measures
Transformational leadership. The Multifactor Leadership Questionnaire (MLQ-5x-short) was used to measure respondents’ perceptions of their leaders (Bass and Avolio, 1995). Transformational leadership was assessed with 20 items, including
the four subscales of idealised influence (“Specifies the importance of having a strong sense of purpose”), inspirational motivation (“Articulates a compelling vision of the future”), intellectual stimulation (“Gets me to look at problems from many different angles”), and individual consideration (“Helps me to develop my strengths”). These items taken together revealed a high reliability ($\alpha = 0.93$). Responses were given on a scale ranging from 0 “not at all” to 4 “frequently, if not always”. The measure of transformational leadership was taken from the time 1 survey and all other measures were those reported at time 2.

**Identification by individuals with the team.** Identification with the team was measured using the scale developed by Mael and Ashforth (1992). The items assessed the level of investment in the group and the extent to which individuals experienced the team’s successes and failures as their own (“When someone criticises my project team, it feels like a personal insult”). The six-item scale had a high reliability ($\alpha = 0.92$). Items were rated on a scale of 1 “strongly disagree” to 6 “strongly agree”.

**Support for creativity.** Team members rated the extent to which their team was open to new ideas and supportive of creativity using five items from Gilson and Shalley (2004). An example item is, “People in our group encourage each other to create new ideas and apply them.” The five item scale returned a high alpha coefficient ($\alpha = 0.90$). The response format was a scale ranging from 1 “strongly disagree” to 5 “strongly agree”.

**Innovation effort.** The measure of innovation was based on the nine-item scale used by Janssen (2001). Individuals rated the frequency with which they engaged in three stages of innovation: idea generation, idea promotion and idea realisation. Three items referred to idea generation, such as “generating original solutions to problems”. Three items referred to idea promotion, such as “mobilising support for innovative ideas”. Idea realisation was measured with a further three items including “introducing new ideas into the work environment in a systematic way”. Responses were given on a scale ranging from 1 “never” to 7 “always”. As with previous research, this scale also returned a high reliability coefficient ($\alpha = 0.94$).

**Experts’ innovation ratings.** To check that the self-report measures by group members were an accurate reflection of actual performance, we invited experts to rate each R&D team. Measures of each team’s level of innovation were obtained from three experts in the same R&D organisation in order to provide an objective measure of the teams’ performance. Each expert was a senior manager in the organisation and each was a regular observer of the activities and performance of each team. The teams were rated on four items regarding innovation, such as “The team’s work is regarded as an important scientific advancement”. Towards completing these ratings, the experts were encouraged to examine objective and confidential organisational performance reports that showed the specific outputs of each team around awarded grants and consultancy contracts, patents, publications, industry reports and related indicators. The items in the four item scale were highly reliable ($\alpha = 0.84$).

**Results**

**Experts’ innovation ratings**

Team members’ ratings of their level of innovation were compared to the mean rating of innovation by the three experts. A median split was used to categorise the teams as less innovative (expert rating of innovation below 3.40) or more innovative (above
An ANOVA was then performed to assess the difference in self-ratings for more or less innovative teams (Burningham and West, 1995). As expected, more innovative teams had higher self-ratings of innovation by team members (M = 5.12) compared to less innovative teams (M = 4.62), F(1, 101) = 6.06, p = 0.02.

Confirmatory factor analyses
Due to the large number of items, parcels of items were created in order to reduce the number of indicators for each construct (Little et al., 2002). This approach reduces sources of sampling error, and is particularly beneficial when the number of items is high relative to the sample size (Little et al., 2002). Using the internal-consistency approach, the four sub-scales of transformational leadership were each grouped into separate parcels to be used as four indicators of the transformational leadership construct. For the time 2 constructs, the items measuring support for creativity were regrouped into two parcels by combining the items with the highest and lowest loadings from a principal components analysis (Wong et al., 2009). That is, the highest loading item was assigned to the first parcel, the second and third highest were assigned to the second parcel, and the final two items were assigned to the first parcel. The innovation indicators were formed using the internal-consistency approach to produce three parcels from the three innovation sub-scales (Janssen, 2001). Confirmatory factor analyses (CFAs) were conducted to assess the discriminant validity between the constructs.

As can be seen in Table I, the four-factor baseline model provides a good fit to the data. The measurement model was compared to a number of alternate models in which the estimated correlation parameters between selected variables were constrained to 1.0, thereby testing whether those variables are perfectly correlated (Garcia-Morales et al., 2008). A significant difference in chi-square values between the baseline and alternate models indicates that the constructs are not perfectly correlated and therefore have discriminant validity. Combining the two hypothesised mediators (climate and identification) yielded a significantly higher chi-squared value, indicating discriminant validity between the two constructs. Similarly, combining all three time 2 constructs resulted in worse fit. Consequently, we were confident that our scales represented distinct measures of our primary variables.

Hypotheses testing
Descriptive statistics and correlations among variables are presented in Table II. As predicted, higher levels of transformational leadership were associated with higher levels of group identification, perceived support for creativity and team innovation. In addition, high levels of group identification and perceived support for creativity were associated with higher levels of team innovation.

<table>
<thead>
<tr>
<th>df</th>
<th>Model $X^2$</th>
<th>$X^2$/df</th>
<th>NFI</th>
<th>CFI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline four-factor model</td>
<td>38</td>
<td>55.30*</td>
<td>1.46</td>
<td>0.94</td>
<td>0.98</td>
</tr>
<tr>
<td>Support and Identification combined</td>
<td>39</td>
<td>84.52**</td>
<td>2.17</td>
<td>0.91</td>
<td>0.95</td>
</tr>
<tr>
<td>Time 2 constructs combined</td>
<td>41</td>
<td>90.56**</td>
<td>2.21</td>
<td>0.90</td>
<td>0.94</td>
</tr>
</tbody>
</table>

Notes: *p < 0.01; **p < 0.001

Table I. Confirmatory factor analyses of baseline and alternate models
To test the mediating role of group identification and perceived support for creativity in explaining the relationship between transformational leadership and team innovation, we conducted multiple mediation analysis through a bootstrapping technique proposed by Preacher and Hayes (2004, 2008). This bootstrapping technique allowed us to examine both the direct effects of transformational leadership on team innovation and the indirect effects of transformational leadership on team innovation through both mediators. For the purpose of our study, Preacher and Hayes bootstrapping approach is superior to other mediation techniques (e.g. Baron and Kenny, 1986) because it allows us to evaluate multiple mediators simultaneously, and to compare the magnitude of indirect effects. Furthermore, bootstrapping methods have greater power to detect significant effects for small samples without assuming normal distribution of the data (Preacher and Hayes, 2008).

To conduct the mediation analysis, we ran Preacher and Hayes (2008) macro which creates an empirically-derived sampling distribution of the indirect effect for each mediator (based on 5,000 resamples of the data). Mediation is assessed by considering point-estimates (or means of each sampling distribution) and bias-corrected and accelerated (BCa) confidence intervals (CI) for each of the proposed indirect effects. Full mediation is demonstrated if the 95 per cent BCa-CI of the indirect effect does not include zero and the direct effect of the independent variable on the dependent variable is rendered non-significant when the mediators are included in the model.

As presented in Figure 1, mediation analyses revealed that the significant direct effect of transformational leadership on team innovation was rendered non-significant

<table>
<thead>
<tr>
<th>Measure</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Transformational leadership</td>
<td>2.72</td>
<td>0.71</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Team identification</td>
<td>4.74</td>
<td>0.97</td>
<td>0.44**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Perceived support for creativity</td>
<td>3.65</td>
<td>0.71</td>
<td>0.35**</td>
<td>0.50**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Team innovation</td>
<td>4.94</td>
<td>1.02</td>
<td>0.29*</td>
<td>0.51**</td>
<td>0.68**</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:** *p < 0.01; **p < 0.001

Table II. Descriptive statistics and correlations

![Figure 1](image)
when both mediators were entered into the model. Bootstrap analyses revealed that the total indirect effect of transformational leadership on team performance through both mediating variables was significant (point estimate $= 0.43$, 95 per cent BCa-CI = 0.21 to 0.76, $z = 4.00$, $p < 0.001$). More relevant to study predictions, the indirect effects through group identification (point estimate $= .14$, 95 per cent BCa-CI = 0.03 to 0.37, $z = 2.28$, $p = 0.022$) and perceived support for creativity (point estimate $= .29$, 95 per cent BCa-CI = 0.12 to 0.61, $z = 3.28$, $p = 0.001$) were significant, indicating that each of the mediators uniquely explained the relationship between transformational leadership and team innovation. The magnitude of the specific indirect effect of group identification did not significantly differ from the magnitude of the specific indirect effect of perceived support for creativity (point estimate $= -0.45$, 95 per cent BCa-CI = $-0.45$ to 0.11, $z = -1.38$, $p = 0.167$). Therefore, group identification and perceived support for creativity exerted equal independent effects in fully mediating the relationship between transformational leadership and team innovation.

**Discussion**

**Key contributions**

As Eisenbeiss *et al.* (2008) propose, we need to better understand the processes that can be used by leaders to better foster innovation and higher levels of performance. All of the predictions in our preliminary model were supported, except that the significant direct effect of transformational leadership on team innovation was made non-significant when both mediators were entered into the model. In short, the current study reveals two processes that have both conceptual and practical value in understanding how transformational styles of leadership during a major period of change can promote greater innovation: promote identification by individuals with their team, and build a team climate that supports creativity.

A major contribution of this study is the demonstration that transformational leadership operates via identification by individuals with their team to positively influence reports about greater efforts to be innovative. By emphasising shared goals and collective interests especially during a period of major transformation, leaders can increase members’ levels of identification with the team (Kark and Shamir, 2002; Shamir *et al.*, 1993). This is particularly relevant in the context of the current study in which organisational restructuring meant that teams were newly formed and were operating in a rather turbulent environment. The R&D team leaders needed to develop a sense of unity in order to encourage these highly educated scientists and other professionals to work together effectively.

Although identification is linked to a number of positive outcomes in teams (e.g. Riketta and Nienaber, 2007; van Knippenberg *et al.*, 2004), it has not been previously shown to predict perceptions of efforts to be innovative. Given the collective goal of producing innovative outcomes in R&D teams, higher levels of identification by individuals with the team should be expected to lead to increased motivation to achieve such outcomes for the team (Kark and Shamir, 2002). Indeed, as Haslam *et al.* (2003) argue, having this shared sense of values and norms through identification with the team is essential for collaboration between people.

Identification by individuals with their team mediated the relationship between transformational leadership and innovation. While identification can mediate the effect on other outcome measures (van Knippenberg *et al.*, 2004), this is a novel finding in
relation to innovation. In a related area, Jaussi and Dionne (2003) found that transformational leadership was linked to increased group cohesion and that cohesion led to higher levels of creativity. However, cohesion was not found to mediate the relationship between leadership and creativity.

One of the distinguishing features of the current study was the separation in time of the measurement of transformational leadership from measures of climate and identification. Also, prior research suggests that time is critical to team dynamics (Arrow et al., 2004; Harrison et al., 2002). In particular, time can provide team members with opportunities to exchange personal and task information, and therefore serve to facilitate team collaboration (Harrison et al., 2002). As the teams had recently been formed at the first stage of the study, they continued to develop as teams over the 12 months. The longitudinal design allowed us to examine these new teams over a short life span, and in doing so to measure how processes instigated by the leader and the team members helped the formation of identities, a team climate and efforts to be more innovative as a team. The validity of the tested model is further strengthened by the use of expert ratings of team innovation. The finding that team members’ own ratings were in line with the ratings of three senior executives provides some verification that team members’ perceptions are indicative of their actual performance. As such, there can be greater confidence that self-reports of innovation are not simply due to common method variance or other potential sources of bias such as higher identifiers seeing their team in a more positive light and reporting higher levels of innovation as a result.

**Limitations**

Although expert ratings were used as a comparison, it would be useful to analyse these ratings as the dependent measure in the full model. In the present study, we were limited by the number of teams and the number of members from each team who completed both phases of the study. A larger sample would have permitted a multi-level approach to the data analysis. Also more objective measures of innovation, such as number of patents or new products, could be employed to further test the influence of leadership, identification and support for creativity on these outcomes. For example, identification has been shown to positively impact sales performance using objective sales data (Wieseke et al., 2009).

Another shortcoming of this study is that it was conducted within a single R&D organisation. Nonetheless, the sample was drawn from a number of teams and different locations. Also, the study employs self-report measures and has no control group, and such issues need to be fully addressed in future studies. Future research needs to examine other samples (e.g. individuals influenced by both charismatic and self-leadership, see Chung et al., 2011), other styles of leadership (e.g. transactional leadership, see Liu et al., 2011), and use more qualitative methods (e.g. narratives and sensemaking, see Ashforth et al., 2008; Landau and Drori, 2008) to unearth or to explore in more depth the social processes applied by leaders of innovation. In terms of future research, ongoing debate exists about the notion that diversity in work groups is linked to higher performance and innovation, with some but not all studies finding this association (see the review by Van Kippenberg and Schippers, 2007). Future research needs to better understand the leader’s role in achieving more positive outcomes from diverse work groups. Such groups offer the potential for bringing together a broad range of task-relevant knowledge, skills and abilities to deal especially with solving non-routine problems that are often at the source of break-through types of innovation.
Conclusions
The present study has begun the exploration of the “black box” that exists around how a more transformational style of leadership might promote greater levels of innovation. Our findings point to how this style of leadership influences team climate and identification, and in turn innovation. Significantly, these preliminary findings in the context of scientific R&D teams add further support to calls for managers to adopt more transformational styles of leadership during periods of organisational change. Such styles do produce better outcomes, both for the organisation around more innovative products and processes, but also for team members who get to enjoy more creative and rewarding team environments despite the demands of operating in highly competitive and often turbulent work environments. As noted by Callan et al. (2004), leaders today need to be skilled not only at disturbing the organisational system, but also in operating effectively in systems that are disturbed and in states of major change. The current study shows that leaders who encourage employees to identify with their team, and who build a positive team climate, not only support sustained creativity and innovation, but possibly encourage employees to capitalize on the opportunities presented by major change.

References


**About the authors**

Neil Paulsen, PhD, is completing research into various aspects of change management, especially around identity management, team work and networks. This line of research develops an intergroup perspective on organisational behaviour, organisational change and leadership effectiveness. He gained his PhD from the University of Queensland.

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