# Title: IS THE PROJECT "MINE" OR "OURS"? A MULTILEVEL INVESTIGATION OF THE EFFECTS OF INDIVIDUAL AND COLLECTIVE PSYCHOLOGICAL OWNERSHIP

Short title: *A MULTILEVEL INVESTIGATION OF INDIVIDUAL AND COLLECTIVE PSYCHOLOGICAL OWNERSHIP*

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**Abstract:**

Challenging the dominant view that individual psychological ownership (IPO) is only relevant at the individual and collective psychological ownership (CPO) at the group level, we developed a multilevel model of psychological ownership. We distinguished theoretically and empirically between two types of ownerships and test how IPO and CPO effect individual and team behaviours. Data were obtained across three-time points from 168 members and their managers in 39 project teams from multiple countries. Results revealed that, at the individual level, both IPO and CPO were positively related to individual engagement which in turn related to individual creativity. However at the group level, group-mean IPO was negatively related to team engagement while group-mean CPO was positively related to team engagement. Team engagement, in turn, was positively related to team creativity. This study sheds light on IPO and CPO as being independent constructs with distinct positive and negative effects on individual and team processes and outcomes.

**Keywords:** Psychological ownership; creativity; engagement; multilevel

**Data availability statement:**

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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## Practitioner Points

- In a team project it is important for every member to feel personal ownership towards the project as it drives individuals to invest more effort and be more creative in the project.
- At the same time, managers should be aware that individual ownership minimizes collective effort. Teams with high individual ownership are less collectively engaged, which in turn diminishes team creativity.
- Managers should invest time in making each team member feel like a project owner, but also focusing on teams developing a feeling of collective ownership ("This is our project") if they expect higher team dedication and more creative project outcomes.

# Is the Project "Mine" or "Ours"? A Multilevel Investigation of the Effects of Individual and Collective Psychological Ownership

**Running head**: Psychological ownership

*"Possession is a magical relation" (Jean- Paul Sartre, 1969:591)*

We all know that we look after the things that are ours. The concept of psychological ownership (PO) reflects a state in which individuals feel psychologically tied to an object (Pierce, Kostova, & Dirks, 2001, 2003) and therefore exert effort to take care of it and are motivated to direct their behavior towards its benefit (Furby, 1978). Organizational scholars have found psychological ownership to positively relate to important attitudinal and behavioral work outcomes, such as affective commitment (Liu, Wang, Hui, & Lee, 2012), organizational citizenship behavior (Van Dyne & Pierce, 2004), work engagement (Ramos, Man, Mustafa, & Ng, 2014), and firm innovation (Rau, Werner, & Schell, 2018).

However, organizational life provides a complex social context in which there is a high level of ambiguity over one's psychological possessions because there is a likelihood that others could claim ownership too (Pierce & Jussila, 2010). Employees are often working together or working towards the group goals, and as such it is important to understand what happens when what is "mine" can be equally claimed as "ours" and as "mine" by someone else. Unfortunately, the current stage of the PO literature has assumed that personal PO ("this is mine") is only relevant at the individual-level and collective PO ("this is ours") at the group-level. It is our view that this assumption has impaired theoretical developments concerning the multiple-level effects of psychological ownership. Distinguishing PO solely based on the level of analysis (individual

and group) fails to consider the possibility that both individual PO (IPO) and collective PO (CPO) can be experienced independently by an individual and by a group. This paper provides a more nuanced picture by taking this duality into account.

In this study, we dovetail the psychology of possession (Belk, 1988; Ditmar, 1992), PO in organizations (Pierce et al., 2001), and paradox theory (Lewis, 2000) to develop a multilevel model of PO. Specifically, we draw on the paradox of belonging (Lewis, 2000) to suggest that individuals simultaneously strive for both self-expression and collective affiliation. In line with other authors who have also argued that human nature is not either/or but rather a mix of both self- and collective attentiveness (Van de Ven, 2007; Werner & Baxter, 1994) we propose that individuals can experience IPO and CPO independently at any point in time and that both these individual experiences also surface at the group level. We then suggest that these co-existing poles of ownership, although not in opposition themselves, will nevertheless produce opposing behaviors.

We examine how PO towards a team project ultimately affects individual and team creativity as this outcome encompasses both required and voluntary aspects (e.g., see Griffin, Neal, & Parker, 2007). Although PO has been associated with outcomes closely related to creativity such as firm innovativeness (Rau et al., 2018), we do not know how the different ownerships affect individual and team creativity. We argue that while IPO will facilitate individual engagement in the project and in turn enhance individual creativity, at the team-level a high group-mean IPO will not benefit team engagement and team creativity behaviors, but on the contrary, will have a negative effect. Conversely, shared feelings of CPO in the team will facilitate collective action - team engagement and creativity - but at the individual level will weaken the pursuit of the personal interests and reduce individual engagement and creativity.

This study makes several contributions. Most significantly, we identify an important theoretical wrinkle in the psychological ownership phenomenon – that IPO and CPO are not homologous (Chan, 1998) across levels and, indeed, may produce conflicting effects. We examine the PO concept through the lens of organizational paradoxes, specifically focusing on the paradox of belonging which highlights the dual human nature that strives towards self and collective interests. This enables us to develop the PO literature by considering multilevel effects and distinguishing the multidimensionality of ownership. Second, we contribute to the conceptualization of PO by considering a different object of possession. PO researchers have mostly been interested in the organization or job as ownership targets. Yet, in a team-based environment these are often not the most relevant targets. The nature of work is becoming more project-based and as such, we examine the team project as a target for PO, thus extending the foci of PO to transient objects. Finally, we contribute to the creativity literature by both exploring the role of PO as an indirect antecedent and by identifying and elucidating factors that may act as both a facilitator and a barrier to this important outcome at different levels of analysis.

## Theory and Hypotheses

### *Individual Psychological Ownership & Collective Psychological Ownership*

We will first define IPO and CPO at both levels before considering their interrelationship and effects. Pierce, Kostova, and Dirks (2003, p. 5) defined individual-level IPO as "a state in which individuals feel as though the target of ownership (or a piece of that target) is theirs (i.e., it is 'MINE')". Within a team, there will be an assortment of levels of IPO amongst the individual members and we propose that this average level of IPO has important implications (discussed in the next section), independently of the implications of collective ownership. We therefore consider group-level IPO to be a configural unit property, capturing the pattern of individual

features within a team regardless the agreement between group members (Kozlowski & Klein, 2000); we define it as the array across the team of team member's feelings that the target of ownership is personally theirs.

On the other hand, CPO has been conceptualized only at the group-level, defined as "the collectively held sense (feeling) that this target of ownership (or a piece of that target) is collectively 'ours.'" (Pierce & Jussila, 2010, p. 812). Thus, Kozlowski and Klein's (2000) approach would suggest that this is a shared unit property where perceptions are common to all in the group. To illustrate, a moderate group-level CPO would be a team where there is consensus that 'we all have a moderate level of shared ownership'. At the same time, however, each team member is making this judgement about the team's sense of shared ownership, and we again argue, as we explain in more detail below, that the recognition of this construct has important theoretical implications. Thus, we define individual-level CPO as the individual's perception that the team feels that the target of ownership is collectively 'ours'. We provide a summary of definitions in table 1.

Our first contribution, therefore, is to suggest that, akin to paradox theory (Lewis, 2000), Pierce and Jussila's (2010) argument that IPO and CPO are joined (i.e., "…there is…a 'mine' in 'ours'; p. 815) is only one part of the story. We agree that the two concepts may be related, but we believe that they are independent of each other. Indeed, at the individual-level a study by Henssen, Voordeckers, Lambrechts, and Koiranen (2014) found that 17% of family firm CEOs experienced a high level of CPO but a low level of IPO and the opposite combination was found in 11% of the sample. Thus, 28% of the sample did not follow Pierce's and Jussila's (2010) original theorising.

So why might this happen? To begin with the individual level, Pierce and Jussila (2010) theorized that personal feelings of ownership (i.e., IPO) emerge through person–object

interactions and suggested that such ownership feelings depend on having control and holding relevant knowledge about the target. In any group, these are likely to vary across team members depending on their interests, expertise in the project's subject matter, project tenure, and so forth. Given these differentiating factors, we suggest that team members are likely to vary in their levels of IPO towards the team project.

Alongside this, we suggest that it is also possible for team members to differ in their individual perceptions of CPO. CPO is based on a perception that this project is OURS; rather than being based solely on person-object interactions it is also based on person-person interactions (Pierce & Jussila, 2010). These person-to-person dynamics will of course be different across each team member suggesting that again CPO may vary at the individual level.

Thus, because they are based on different mechanisms (person-object interactions only, and both person-object and person-person interactions, respectively), a team member's IPO and CPO may be different. For example, an employee might have lower IPO in comparison to CPO (e.g., I don't feel much personal ownership of this project because I can't influence decisions, but there is a working consensus so I do feel like the project is ours). Alternatively, a team member might have a higher IPO in comparison to CPO (e.g., I feel that I have some control over this project and therefore I feel like this is my project, but I don't like some of the team members and therefore I don't feel the project is ours). Hence, we hypothesize that:

*Hypothesis 1a: Individuals in teams differentiate between their perceptions of IPO (This is my project) and CPO (This is our project).*

By the same token, it is also necessary to establish whether IPO and CPO remain distinct constructs when considered at the team level of analysis. Pierce and Jussila (2010, p. 810) outline how "collective psychological ownership emerges through interactive dynamics whereby

individuals come to a single and shared mind-set as it relates to a sense of ownership for a particular object." Thus, team-working and working towards the same overall goal will encourage a feeling that collectively the team owns the project (i.e., group-level CPO).

However, similar to arguments around self-efficacy (Bandura, 1997) and other collective constructs (e.g., Kristof-Brown, Seong, Degeest, Park, & Hong, 2014), we suggest that the group-level CPO will be different to the average IPO in the group. Brown, Crossley, and Robinson (2014) have argued that although groups may develop CPO where an object is shared, it can also be the case that two or more individuals can simultaneously feel an object as belonging to him or herself personally. Therefore while the group-mean IPO will depend on team members' individual experiences, a collective construct such as CPO surpasses the individual and persists even if team membership changes (Morgeson & Hofmann, 1999). As noted above, we propose this as a distinguishable feature of CPO and therefore it will be different from the average of personal ownership in the group. Thus, we hypothesize that:

*Hypothesis 1b: At the team level, group-mean CPO is distinguishable from group-mean IPO.*

***Effects of IPO on Individual and Team Engagement and Creativity***

We begin our multilevel model theorizing with the IPO and engagement relationship. Kahn (1990) defines engagement as employing an individual's full self in terms of physical, cognitive, and emotional energies to work role performances. The psychology of possession suggests that experiencing possessive feelings towards a target will enhance the harnessing of one's energy towards it, such as investing time and effort and giving it more attention (Belk, 1988).

Although some research suggests the possibility of reverse causality (Wang, Law, Zhang, Li, & Liang, 2018), most studies provide evidence that PO leads to higher engagement based on a

motivational pathway. For instance, PO has been found to affect motivational outcomes such as affective commitment (Avey, Avolio, Crossley, & Luthans, 2009; Liu et al., 2012) and job satisfaction (O'driscoll, Pierce, & Coghlan, 2006; Van Dyne & Pierce, 2004). More direct evidence supporting the effects of PO on engagement is offered by a recent study showing that organization and job based PO were positively related to work engagement in family business (Ramos et al., 2014). As such we hypothesize that:

*Hypothesis 2a: IPO positively relates to individual engagement.*

Further, we suggest that IPO can be a root for individual creativity via its effect on engagement. We define creativity as "the production of novel and useful ideas concerning products, services, processes, and procedures by individuals or a team of employees working together" (Shin & Zhou, 2007, p. 1710). In the context of projects, individual creative behavior is expressed when team members independently generate new ideas in relation to their assigned tasks. Engagement is characterized by motivation and positive emotions, such as happiness and enthusiasm (Demerouti & Cropanzano, 2010), which enhance cognitive flexibility and widen the range of thoughts and actions necessary for creativity (Dreu, Nijstad, & Baas, 2011). Indeed, research suggests that work engagement is positively related to creativity (Bakker & Xanthopoulou, 2013) and innovative behavior (Aryee, Walumbwa, Zhou, & Hartnell, 2012). Hence, we expect that a team member who feels as if the project is his/hers will experience higher individual-based engagement in that project, which in turn will result in higher individual creative output.

*Hypothesis 2b: Individual engagement positively relates to individual creativity.*

*Hypothesis 2c: IPO has a positive indirect relationship with individual creativity via individual engagement.*

At the group-level, we consider team engagement to be a collective construct that emerges from the interaction and shared experiences of the team members and is characterized by the team fully investing physical, cognitive, and emotional resources towards the team's goals (Morgeson & Hofmann, 1999; Torrente, Salanova, Llorens, & Schaufeli, 2012). Examples of high levels of team engagement include the team members' willingness to invest effort in work in the face of difficulties, encouraging others to persist, and talking to each other and to others (external to the team) enthusiastically about the team's project. At the group-level a high group-mean IPO means that although members may be individually engaged, focused and protective of their individual work, they might not necessary be engaged in facilitating team effort and enthusiasm. Personal ownership behaviors may signal to others that individuals in the group feel more interested in doing things their own way than being concerned about the views of the entire team (Brown et al., 2005). Due to social influence other members can also become less enthusiastic in sharing knowledge, giving feedback to each other or boosting team's energy. Therefore, it is expected that the existence of high IPO members in the team (i.e., high team mean IPO) will lead to the team overall being less engaged as a unit. Thus, high group-mean IPO will lead to a decrease in enthusiasm and positive shared experiences that are essential to the emergence of team engagement (Morgeson & Hoffmann, 1999), diminishing team creative effort, even when individuals are personally creative (e.g., Taggar, 2002). Although one or two team members exhibiting strong IPO may provide a dissenting voice that promotes overall team creativity (e.g., De Dreu, 2002), in a team with a high group-mean IPO, such dissent becomes normative rather than minority-based and would not provide the participation in decision-making required to take advantage of the dissent (e.g., De Dreu & West, 2001).

Therefore, we again hypothesize an indirect effect between IPO and creativity via team engagement. Costa, Passos and Bakker (2014) theorise that although team engagement is structurally different from individual engagement, functionally it is the same. Collective creativity occurs when group members stimulate one another's divergent thinking and their individual ideas are combined into the group's creative output (George, 2007; Sacramento, Dawson, & West, 2008) and, as such, investment of the team's resources towards team goals should be positively related to team creativity. In teams with high levels of collective engagement this type of investment and shared experience has been found to facilitate performance (Salanova, Llorens, Cifre, Martínez, & Schaufeli, 2003; Torrente et al., 2012) and is also a key ingredient in fueling team creativity. In highly engaged teams, members will be able to work synergistically, building on each other's ideas, exchanging resources, providing feedback, thus resulting in the development of new and better ideas that belong to the team.

*Hypothesis 3a: Group-mean IPO negatively relates to team engagement.*

*Hypothesis 3b: Team engagement positively relates to team creativity.*

*Hypothesis 3c: Group-mean IPO has a negative indirect effect on team creativity via team engagement.*

***Effects of CPO on Individual and Team Engagement and Creativity***

CPO is typically considered as a shared team property and although research is somewhat limited, it has been positively associated with team outcomes such as increased effort and productivity (Druskat & Pescosolido, 2002; Pierce & Jussila, 2010). Indeed, Campion, Medsker, and Higgs (1993) suggest that group ownership is one of the main means to enhance team effectiveness of self-managed teams. Collective ownership implies that the team as a whole owns the project and thus the attention is focused on the collective interests, which differently to IPO, facilitates

collective action. Likewise, the theory of possession suggests that while individual ownership is characterized by protecting targets from others (Belk, 1988; Ditmar, 1992), collective ownership reduces this behavior amongst others in the group (Pierce & Jussila, 2010), thus enabling collective effort. Druskat and Pescosolido (2002) note that shared feelings of CPO would involve the collective belief that team outcomes were under the team's responsibility, thus encouraging team members support each other in the face of difficulty, spending time talking about the project outside project time, as well as sharing enthusiasm and pride about the project. When team members have a common understanding of the project as theirs, they are more likely to be protective of the collective interests, and to fully commit to the team's work, resulting in higher team engagement. Thus we propose:

*Hypothesis 4a: Group-mean CPO positively relates to team engagement.*

From the above (Hypothesis 3b and 4a) it follows that CPO is indirectly related to team creativity via its positive effect on team engagement. When team members have shared perceptions of the project as theirs, they are more likely to focus and invest energies into the team goals resulting in higher team engagement and ultimately team creativity. There is some empirical work which supports our underlying premises. Zhu, Gardner, and Chen (2016) reported that collaborative team climate had a direct positive relationship with creativity. Baer and Brown (2012) found that when team members thought of the idea as "ours" they were more willing to adopt the suggestions of others, in turn leading to better idea quality. Therefore, we hypothesize:

*Hypothesis 4b: Group-mean CPO has a positive indirect effect on team creativity via team engagement.*

We have suggested the existence of a positive relationship between CPO, team engagement and team creativity, but we now argue that this positive relationship will not hold

when it comes to individual-based behavior. As explained earlier, paradox theory (Lewis, 2000) argues for the independent nature of the individual and the collective poles, and the existence of potential tensions between these. We propose that at the individual level, CPO will weaken the effect towards individual engagement because experiencing the feeling "This is ours" will diminish individuals' focus towards their own visions and pursuits and motivation to express themselves. Therefore, we hypothesize that team members with high CPO will experience lower individual engagement and consequently will be less likely to pursue their individual visions and deliver independent creative outputs. Therefore, we propose that:

*Hypothesis 5a: CPO negatively relates to individual engagement.*

*Hypothesis 5b: CPO have a negative indirect effect on individual creativity via individual engagement.*

## Method

### *Sample and Procedure*

Drawing on her professional network, the leading author approached HR and project managers from international organizations based in the United States, United Kingdom, Lithuania, and China. Our objective was to obtain a sample representative of different cultural backgrounds, reflecting our assumption that individuals have an innate need to possess, and that the desire to collect objects and possessions can be observed across most cultures (McDougall, 1923).

For teams to qualify for participation in this study, three main criteria had to be met. First, teams had to be actively involved in the execution of a project for an internal or external client - 'project' being defined as a group task with a timeframe, budget and scope. Second, this project required creativity. Finally, only teams with at least two members and a leading project manager

working closely together could be recruited. Examples of projects included developing a mobile software, creating and implementing a building design and launching an event.

To solicit participation, the first author held initial meetings either via skype or face to face with the HR, program or project managers in contacted organizations when the purpose of the project and its benefits were outlined. In exchange for participation, all project leaders were offered a feedback report. This led to the recruitment of 43 teams comprising 228 employees and 43 team leaders. Twenty-one percent of the respondents were based in China (12 teams), 74% in Lithuania (29 teams), 2.6% in UK (1 team) and 1.75% in US (1 team). Given the very limited number of teams in the UK and US we considered excluding these from the data collection but we decided against it as first they add to the global character of the sample, and second, given the complexity of the analysis, any loss in terms of sample size should be avoided. We did however test the model excluding these teams and the pattern of results remained unchanged.

We followed Ployhart and Vandenberg's (2010) guidelines of introducing time lags between data collections to address issues of causality and avoid common method variance. In the first on-line questionnaire (T1), team members provided demographic information and reported their IPO and CPO towards the specific project. In a second questionnaire three weeks later (T2) they reported their levels of individual engagement in the project and their own creativity. At the same time (T2), project managers were emailed their first questionnaire in which they rated the team's engagement in the project. Finally, three weeks later managers received a second questionnaire capturing team creativity (T3).

After participation was agreed, the contact person in each organization was asked to provide a list of participants, their emails and the project title or code that all team members were familiar with. Surveys were distributed to 228 team members, of which 190 (83.33%) responded

to the time 1 survey and 162 (71.05%) to the time 2 survey. We were able to match 157 responses between T1 and T2. Of the forty-three managers who were initially emailed, 38 (88.37%) responded to their first survey and 37 (86.05%) to the second survey. We were able to match 34 managers' surveys at T1 and T2. In order to maximize sample size, we opted for keeping all individual unmatched answers in the sample so this could be used to create the group latent means used in MSEM analysis. The within team response rate in our sample was 84%, varying from 33% to 100%, and thus we believe providing good representation of the overall team perceptions. The final sample in which we conducted the analysis consisted of 39 teams and 186 individuals.

The size of the teams excluding leaders ranged from 2 to 20 members ($M$ = 5.64, $SD$ = 4.67). The average age of respondents was 30.63 years ($SD$ = 5.71), with an average company tenure of 4 years ($SD$ = 3.42) and an average project tenure of 10 months ($SD$ = 8.00). Most participants had university degrees with 41.4% holding undergraduate and 40.3% postgraduate degrees. Among the rest, 9.4% held professional bachelors and 7.7% had a high education degree.

***Measures***

For the Chinese and Lithuanian participants all the scales used in this study were translated from English into Chinese and Lithuanian and then back translated by different translators (Brislin, 1986). The first author and two Human Resource Management professionals fluent in both Chinese/Lithuanian and English examined the questionnaire to ensure that the items were interpretable. All variables were measured on a 7-point Likert scale from 1- strongly disagree to 7- strongly agree.

A point worthy of notice is that although we had initially planned to use the same instrument to measure individual and team creativity (see individual creativity measure), during the piloting of the questionnaire in the largest organization we received feedback that even

although team leaders were in close contact with their teams, they would not be capable of answering all the items in good knowledge, and instead an instrument more focused on the team's creative output would be preferable. After discussion we agreed that the alternative team creativity scale developed by (Farh, Lee, & Farh, 2010) would be more suited to capture team creativity in the context of the projects we surveyed, while in relation to individual creativity, the more process focused scale leant itself well to individuals reporting on their own creativity.

*Individual and Collective Psychological Ownership*

To assess IPO and CPO we first selected the 7-item inventory by Van Dyne and Pierce (2004). Due to the scale's inclusion of items capturing both individual and collective ownership, a concern already noticed in the literature (Dawkins, Tian, Newman, & Martin, 2017), and our focus on the project instead of the organization, we went through a number of steps to adapt the scale. First, we replaced the word "organization" with "project" to reflect our foci of ownership. Next, given that four items of the scale reflected individual ownership and three collective ownership, we changed the referent (e.g., 'This is our project' became 'This is my project') so that all items captured individual ownership. This led to the two redundant items, which were omitted, resulting in a 5-item scale. The same procedure was repeated for the CPO measure, but here we framed the items in collective terms (Morgeson & Hoffman, 1999) resulting also in 5-item CPO scale, (e.g., 'I feel a very high degree of personal ownership' became 'My colleagues and I feel a very high degree of personal ownership').

Following Hinkin's (1995) recommendations, we asked four subject matter experts (doctoral students and lecturers with expertise on organizational psychology) to sort the 10 items across two categories, one described as 'Perceptions that one owns a project' and the other described as 'Perception that the team owns a project'. Associated with each category, participants

were also provided with the respective definitions of IPO and CPO. Results showed that the four experts were able to differentiate between the two categories, and the items were successfully allocated 100% of the time thus speaking for the face validity of the measures.

Next, we conducted an additional scale validation study in order to explore the factor structure and further refine the PO measures. We asked 451 postgraduate students distributed across 106 teams working on a group assignment to report their perceived individual and collective ownership towards the team project. The assignment ran over the course of six weeks and the measures were completed during week five. Average team size was 4.60 (*SD* = 1.28). We used these data to run EFA in MPLUS 8.0 (Muthén & Muthén, 1998-2017) with geomin rotation by entering all IPO and CPO items jointly and allowing these to load freely. The EFA yielded a two-factor solution and all IPO and CPO items had significant factor loadings on their intended factors except for the reverse coded items "It is hard for me to think about this project as MINE" (IPO) and "It is hard for my colleagues and I to think about this project as OURS" (CPO) which had loadings inferior to .40 (Hinkin, 1998). Thus we removed those two items from further analysis. Also, the CPO item "Most people that work for this project feel as though they own the project" exhibited loadings across both factors (IPO factor .30, CPO factor .43). Given that the factor loading of this item on CPO was close to a cut off value of. 40 and the difference with a cross loading on IPO factor was .13 which is smaller than recommended .20 (Ferguson, & Cox, 1993) we also removed this item from further analysis. The remaining 4-IPO and 3-CPO items loaded .80 or above on their intended factor. Cronbach's alpha for both IPO and CPO were .93.

We further extended the analysis to Multiple EFA in order to explore whether the factor structure holds at level 1 and level 2. We allowed the 4-IPO items and 3-CPO items to load freely at both within and between levels. Items demonstrated significant loadings on their intended

factor at both levels without any significant cross-loadings. We report IPO and CPO scales and MEFA factor loadings in appendix.

We further used IPO and CPO scales to test the hypothesized model in the organizational sample. Since scales were used in different countries, we also tested for its invariance across western (Lithuania, UK, US) and eastern (China) locations. We adopted the automatic procedure available in Mplus 8.3 (Muthén & Muthén, 1998-2017) which allows the simultaneous computation of both configural, metric and scalar models and offers the results for the $\chi 2$-square difference tests across the different steps. We used the estimator MLR and applied the Satorra-Bentler (2010) $\chi 2$ correction procedure. The fit indices for configural model were $\chi 2$ (24) = 42.63, CFI = .97, RMSEA = .09, SRMR =.05 indicating that both groups associate the same subsets of items with the same constructs. Further, the fit for metric model was $\chi 2$ (29) = 52.90, CFI = .97, RMSEA = .09, SRMR =.08, and for scalar model was $\chi 2$ (34) = 62.62, CFI = .96, RMSEA = .09, SRMR =.08. The subsequent chi-square difference tests between the configural and the metric model ($\Delta\chi 2$= 10.16, $p$ = .07) and between the metric and the scalar model ($\Delta\chi 2$ = 9.85, $p$ = .08) were not significant, thus providing evidence of metric and scalar invariance (Vandenberg & Lance, 2001). Together, we interpret these results as supportive evidence that both groups perceived and interpreted the measures in a sufficiently similar fashion.

*Individual Engagement*

We adapted the job engagement scale developed by Rich et al. (2010) to the team project context. The original scale comprises 3 dimensions of physical, emotional and cognitive engagement. We used a shorter 9-item version, with three items representing each dimension. A

sample item of physical dimension is “I exert my full effort to this project”, emotional dimension is “I felt excited about this project”, cognitive dimension “I was focused on this project”.

*Individual Creativity*

We measured individual creativity by adapting four items from Jabri (1991) individual creative problem solving measure reported by Gilson and Shalley (2004) in the project team context. Although Gilson and Shalley (2004) adopted Jabri’s (1991) items at a team level, we used Jabri’s original referent at the individual level. Sample items were: “I linked ideas that originate from multiple sources.”, “I searched for novel approaches not required at the time”. We used a self-reporting measure for individual creativity because employees themselves are in the best position to report upon their own creativity as they are aware of the subtle things they do in their jobs that make them creative (Shalley, Gilson, & Blum, 2009). This is a commonly accepted practice by creativity scholars (Dul, Ceylan, & Jaspers, 2011; Stea, Soda, & Pedersen, 2016). Furthermore, researchers previously found that self-reported creativity is correlated with supervisor-reported creativity (Axtell, Holman, Unsworth, Wall, Waterson, & Harrington, 2000). This approach is also beneficial as it avoids having managers rating both individual and team creativity.

*Team Engagement*

We asked project managers to report the levels of their team engagement. We used the same items adopted from Rich et al. (2010) as reported in the individual engagement section just shifting the referent to the team level. A sample item of physical dimension is “My team exerted full effort to this project”, emotional dimension is “My team felt excited about this project”, cognitive dimension “My team was focused on this project”.

*Team Creativity*

We used Farh et al.'s (2010) approach to measuring team creativity in the project team context. Project managers rated their team's creativity by using 2 items from Oldham and Cummings (1996): indicate the extent to which the team output was "creative", "original and practical". Following Farh and colleagues' (2010), we also added a third item: "The team output demonstrates that the team is capable of using existing information or resources creatively".

*Controls*

Given the computational demands of MSEM and the relatively small sample size, we aimed to limit the number of controls in the model to those strictly necessary to avoid losing power (Bernerth & Aguinis, 2016). At the individual level, we controlled for tenure in the project, which was previously found to relate to creativity (Farh et al., 2010). At the team level, we controlled for team size as it has been suggested to influence employee creativity and team processes (Hirst, Van Knippenberg, & Zhou, 2009). Team size was assessed by the number of names reported by program leaders on the consent form. Four countries were represented in the sample, China, Lithuania, UK and US; however, as stated earlier, the last two comprised only one team each. Thus, instead of including three dummy variables leading to convergence issues, we controlled for East (China) versus West (Lithuania, UK and US) reflecting the key cultural categories.

**Analytical approach**

Since we hypothesized collective ownership as a shared team property along which members are expected to coalesce, we first calculated Rwg as an index of the within-group agreement (James, Demaree, & Wolf, 1984). To justify the application of multilevel analyses, we calculated ICC1, which indicates the proportion of variability at the individual level that can be attributed to group membership, and ICC2, which represents the reliability of group means

(Bliese, 1998). The mean values were .78 (Rwg), .31 (ICC1) and .66 (ICC2) suggesting a strong within-group agreement (LeBreton & Senter, 2008) and indicating that group membership determined 31% of the variance in this variable (Bliese, 1998). We acknowledge that the ICC2 is lower than the conventional .70 cutoff point (James, Demaree, & Wolf, 1984), which may attenuate relationships at the group level. This may be due to the relatively small group sizes in the sample (Klein & Kozlowski, 2000). However, given that the rwg was above .70 (LeBreton, & Senter, 2008), the ICC1 value was much higher than the than many others reported in team research (cf., Kirkman et al., 2009; LeBreton, & Senter, 2008), and the ICC2 was only slightly below the conventional cut-off point, we concluded there was sufficient support for treating CPO as a shared team property and proceed with multilevel analysis.

We used a two-stage multi-level structural equation modelling (MSEM) approach to test the hypothesized model using MPLUS 8.0 (Muthén & Muthén, 1998-2017). In the first stage, as described later in more detail, we followed Dyer, Hanges, and Hall (2005) procedure for multilevel confirmatory factor analysis (MCFA). In the second stage we tested hypotheses 2-5 depicted in Figure 1 using MSEM, which allows simultaneously testing structural equation models in level 1 and level 2 (Preacher, Zyphur, & Zhang, 2010). Due to the high computational demands associated with the multilevel model and the low sample size, we calculated scale means for multi-item measures. As IPO and CPO variables were measured at level 1 but hypothesized at both levels we used manifested means at level 1 while latent group means were used at level 2. This latent covariate approach in which the group average is treated as a latent variable is superior to other approaches, such as using group aggregated means, as it takes the unreliability of the group mean into account (Lüdtke, Marsh, Robitzsch, Trautwein, Asparouhov, & Muthén, 2008).

To assess how well the proposed model fits the data, we applied commonly used fit indices for single-level models in SEM: comparative fit index (CFI) ≥ .95, standardized root mean square residual (SRMR) ≤ .08, and root mean square error of approximation (RMSEA) ≤ .10 for an acceptable model fit (Hu & Bentler, 1999; MacCallum, Browne, & Sugawara, 1996, Browne & Cudeck, 1994). We note that the values of RMSEA and SRMR are affected by the small sample size resulting in higher values of these fit indices (Hu & Bentler, 1999; Taasoobshirazi & Wang, 2016; Kenny, Kaniskan, & McCoach, 2015). Thus, following Marsh, Hau, & Grayson (2005) recommendations we used these as guidelines and not strict rules for each index considering the overall model fit statistics when assessing the single-model fit. As to our knowledge there are no clear guidelines on fit indexes for multilevel models, especially for interpreting the level-2 fit, we were also guided by recently reported ranges for each index based on a review of 58 multilevel studies (Kim et al, 2016): mean CFI = .95 (SD= .05, min = .77, max= 1.0), mean RMSEA = .04 (SD=.02, min= .00, max=. 11), mean SRMR within = .04 (SD= .02, min= .01, max= .11), mean SRMR between = . 08 (SD= .06, min =. 01, max = .24).

**Results**

***Measurement Models (Hypotheses 1a and 1b)***

We started by examining the measurement model which also serves as a test of Hypotheses 1a and 1b, stating that individual ownership perceptions are distinct from collective ownership perceptions at both levels of analysis.

Reflecting the multilevel nature of our model, we followed Dyer, Hanges, and Hall (2005) procedure for multilevel confirmatory factor analysis (MCFA). Following the recommended procedures, we first examined the individual- and team-level factor structures independently and then ran a multilevel CFA. Table 2 reports the fit statistics for a 4-factor model including all

individual level variables: IPO, CPO, individual engagement[1] and individual creativity. The hypothesized 4-factor model showed a mediocre fit, $\chi 2$ (71) = 203.797, RMSEA = .10, CFI= .92 SRMR = .09, although still a superior fit to alternative models collapsing these factors. An examination of the modification indices indicated that the model could be improved by allowing error terms for two items (IPO1 and IPO2) to correlate. Although there is no unanimous agreement on this approach (MacCallum, 2003), some researchers do argue that such practice can be pursued with careful consideration and theoretical justification (Silvia, & MacCallum, 1988; Byrne, 2012). We thus followed Byrne's (2012) approach that consents to correlate error terms for items that refer to the same construct, particularly when these are very similar (cf., Madrid, Patterson, Birdi, Leiva, & Kausel, 2014), as was the case here. We have conducted all CFA procedures allowing for this correlation and observed an improvement model fit to the data ($\Delta\chi^2/\Delta df$ =53.342/1, CFI=. 96, RMSEA= .07, SRMR= .06). This model also fitted data better than all alternative models namely 3-factor, 2-factor, and 1-factor models described in table 2.

We next conducted analyses at the group level to verify whether the distinctiveness between IPO and CPO could be replicated, and also to establish the distinctiveness between all team-level concepts. Level 2 CFA results in Table 2 show the fit statistics for our hypothesized 4-factor model including IPO, CPO, team engagement and team creativity ($\chi 2$ (58) = 67.818, CFI =

[1] In order to maximize item to respondent ratio (Nasser & Wisenbaker, 2003) we used content parceling for individual and team engagement items. We followed Landis, Beal, and Tesluk's (2000) recommendations for parceling multidimensional constructs and created parcels based on the three construct dimensions.

.98, RMSEA = .06, SRMR = .10). We note that SRMR was above the cutoff point of .08 (Hu & Bentler, 1999), but this is not unusual due to the small sample size smaller than 50 (Taasoobshirazi & Wang, 2016). Considering that other indices CFI and RMSEA indicated a good fit we treated the model as acceptable. This model was better than alternative 3-factor, 2-factor, 1-factor models described in table 2. Thus, Hypothesis 1b, which states that the shared perception of collective psychological ownership differs from aggregated perceptions of individual ownership, found initial support.

The final steps in the multilevel CFA are to take the confirmed individual- and team-level factor structure and run a multilevel CFA (Dyer et al., 2005). However, due to group level sample size restrictions we were not able to perform a multilevel CFA having all eight factors (four at individual level and four at a group) modeled. Given that core to our research was the distinctiveness of IPO and CPO at individual and team levels, we opted to conduct the two-level CFA analysis including only these constructs and by doing so, allowing for a more conservative test of Hypotheses 1a and 1b. Following Hox, Maas, and Brinkhuis' (2010) recommendation and to enhance the accuracy of statistical tests, we used a weighted least squares mean-adjusted (WLSM) estimator deemed to be more appropriate when the number of between-level cases is low. The 2-factor model where IPO and CPO indicators were loaded on to separated factors simultaneously at the individual and group level produced a good fit (CFI= .99, RMSEA=.02, SRMR within= .04, between= .07). It also fitted the data better than an alternative one factor model where all IPO and CPO indicators were loaded on one factor at both levels (CFI= .00,

RMSEA= .18, SRMR within = .16, between =. 08).[2] In addition to MCFA, we calculated a heterotrait-monotrait ratio of the correlations (HTMT), which is a more robust test for discriminant validity (Henseler, Ringle & Sarstedt, 2015). HTMT (IPO CPO) was .66 and .81 for individual and team level respectively meeting the most conservative criterion of HTMT .85 (Henseler, Ringle & Sarstedt, 2015). This suggests that individuals differentiate between perceptions of IPO and CPO and that such a distinction exists at both individual and group levels, providing additional support to Hypotheses 1a and 1b.

***Model Testing (Hypotheses 2-5)***

We report variable means, standard deviations, Cronbach alpha coefficients and correlations among model variables in Table 3. To test hypotheses 2 and 5, at level 1 we regressed individual creativity on individual engagement and the latter on IPO and CPO. At level 2, we regressed team creativity on team engagement and the latter on both CPO and IPO, based on which we tested hypotheses 3 and 4. The fit indices for the MSEM mediation model indicated overall acceptable fit RMSEA = .02 CFI = 1.0, SRMR-W = .03, SRMR-B = .16 and comparable to the fit for multilevel models reported in the literature (Kim et al, 2016).

To obtain a more accurate test of the proposed indirect effects we used the Monte Carlo Method for Assessing Mediation (MCMAM) and operationalized it using the Selig and Preacher

[2] As was the case at the individual level, when conducting the group and multilevel analysis we also tested an alternative model not allowing the error terms to correlate. In both cases, the hypothesized solution presented a better fit than other solutions with collapsing factors.

(2008) online tool. For all indirect effects we report 95% confidence intervals based on 20,000 repetitions. We summarize the direct effects in figure 1 and report indirect effects in table 4.

Hypothesis 2a, suggesting that IPO was positively related to individual engagement in the project ($\gamma = .15$, $p < .05$), was supported. Hypothesis 2b, suggesting a positive effect of individual engagement on individual creativity ($\gamma = .42$ $p < .001$) and Hypothesis 2c, suggesting an indirect effect of IPO on individual creativity via individual engagement, were also supported, with effect = .06, [.0142, .1095].

In Hypothesis 3a it was proposed that the latent group mean IPO was negatively related to team engagement, which was supported ($\gamma = - 6.72$, $p < .001$). Hypothesis 3b suggesting a positive effect of team engagement on team creativity was also supported ($\gamma = .33$ $p = .01$), as was Hypothesis 3c suggesting a negative indirect effect of the latent group mean IPO on team creativity, via team engagement (effect = -2.24, [- 4.927, -.3448]).

In relation to Hypothesis 4a, there was a significant effect of the latent group mean CPO on team engagement ($\gamma = 4.92$ $p < .001$), thus this hypothesis was supported, as was Hypothesis 4b, suggesting a positive indirect effect of the latent group mean CPO on team creativity via team engagement (effect = 1.64, [.2282, 3.626]).

Finally, we found a significant relationship between CPO and individual engagement but in the opposite direction to that hypothesized ($\gamma = .22$, $p < .001$), rejecting Hypothesis 5a. Hypothesis 5b, proposing a negative indirect effect of individual perceptions of CPO on individual creativity via individual engagement, was not supported: although the indirect effect of CPO to individual creativity was significant, it was positive, thus in the opposite direction to what was predicted effect = .09, [.0402 .1554].

## Discussion

This study presents the first multilevel examination of PO and its positive and negative effects. By distinguishing IPO from CPO and testing their differential effects on creativity via engagement at the individual and team levels, we conceptually and empirically support the differentiation of IPO and CPO and show its meaningful and distinctive effects on outcomes at both levels of analysis.

Although past research has confirmed that both IPO and CPO relate positively to individual outcomes, these results suggest that effects diverge when it comes to the team level. In particular, the results from this study demonstrate that although CPO has positive effects on engagement, and subsequently on creativity, at both the individual and team level, IPO does not. While IPO enhances individual creativity via individual engagement, at the team level, the average level of IPO in the team has a negative effect on team engagement, which in turn is related to decreased team creativity. Together, these results provide a more nuanced picture of the positive and negative effects of psychological ownership.

### *Theoretical Contributions*

In a recent review, Dawkins et al. (2017) suggest that the theory and research of PO can be advanced by refining PO concept and measurement, applying a multilevel perspective on PO, considering alternative theoretical lenses for understanding how PO influences work outcomes and examining the outcomes of different foci of PO. Our study addresses these calls.

First, by applying a paradox of belonging lens (Lewis, 2000) to the psychology of possession (Belk, 1988; Ditmar, 1992), we argued that individuals can experience both IPO and CPO independently. The tests of, construct, discriminant and face validity refine the measurement of PO demonstrating that individuals differentiate between perceptions of "This is mine" and

"This is ours". By further applying a multilevel perspective we provide supportive evidence for IPO and CPO being meaningful constructs when studying both individuals and teams. MEFA and MCFA results in independent samples confirm that ownership items load on two separate factors and that this structure is maintained at the individual and the team levels. This extends previous theorizing on PO which has posited that CPO is built on IPO (Pierce & Jussila, 2010). Instead, we suggest that IPO and CPO can co-exist and these are distinct constructs with distinctive processes and effects.

Second, our results provide empirical support for the multilevel PO model (Pierce & Jussila, 2010) and these findings align with Kozlowski's and Klein's (2000) notion that it is very rare for effects at the individual level of analysis to generalize neatly to the group level. While the effects of CPO on engagement and creativity do generalize across levels, the effects of IPO unfold in opposite directions, as they are positive at the individual but negative at the team level. Examining and identifying these cross-level effects is imperative when considering PO in teams. Interestingly, in contrast to the effects of group mean IPO on team engagement which we found to be negative, we did not find that high individual-level CPO had a negative effect on individual engagement, as was hypothesized. Instead, CPO was positively related to individual engagement and positively indirectly related to individual creativity. On reflection, we propose that this may have occurred because of a sense of individual-level obligation to work hard on behalf of the team, and this then was related to greater individual engagement. Indeed, Henssen and colleagues (2014) found that family firm CEOs with high CPO behaved like stewards, serving company's interests more than their own. This suggestion requires further investigation but it highlights the need to differentiate between IPO and CPO and their relationship to different types of goals. We prompt future studies to investigate the potential boundary conditions under which CPO can

negatively affect individual aspects of work while maintaining its positive effects on group processes.

Third, we have created a greater understanding of the nomological network of PO. Given the importance of team and project work in the current workplace, we selected "a project" as a foci of ownership and studied how the feelings of ownership towards a project influences individual and team work outcomes, specifically engagement and creativity. Previously, researchers focused on examining organizational based and job based ownership (Ramos et al., 2014), which has a long-term focus. We contribute to PO research by demonstrating that it plays an important role in time-bounded work where tenure and membership are likely to change regularly. Studying such temporally-unstable objects of ownership is particularly relevant in the context of a contemporary work place where project based work is increasing and job roles are becoming blurred.

Finally, we also contribute to creativity research by providing new insights that employee engagement may be a proximal psychological resource through which PO stimulates creativity. Creativity researchers have established intrinsic motivation, such as passion for one's work and enjoyment of challenges, as a key currency of workplace creative behaviors (Amabile & Pratt, 2016). We enhance understanding on how a motivation to control, protect and take care of a project work depending on its locus can positively and negatively affect creativity via engagement. We extend previous work examining engagement as an important linkage through which employees are motivated to develop and explore unconventional options to find novel solutions (Aryee et al., 2012; Gilson & Shalley, 2004). We also respond to creativity researchers' calls to address the complexities of creativity at work through a multilevel lens (Anderson,

Potočnik, & Zhou, 2014) by examining individual and team processes in relation to individual and team creativity.

***Limitations and Future Research Directions***

This study has some strengths and limitations which potentially suggest opportunities for future research. First, it is worth mentioning that the data for our study benefits from a multi-source, multi-wave and multi-level design. Individual-level variables were measured at two and team-level variables were measured at three different time points, using team members' reports on individual and collective ownership orientations (Time 1) and individual engagement and creativity (Time 2), as well as manager reports on team engagement (Time 2) and creativity (Time 3). Given that the time lag between measurements was three weeks we have some confidence in the direction of our hypothesized relationships. We also acknowledge that at the individual level, although our independent variables were measured at a different time point than individual engagement and creativity, the data on the intervening and dependent variable were obtained at the same point in time. As such, the relationship between individual engagement and creativity might be influenced by method bias. Future research that temporally separates these constructs or employs an experimental design will be better placed to ascertain the causal status of the relationships we reported. We also acknowledge that despite the high participation rate in our teams (which was on average 84%), small teams in which only two or three members reported results limit the size of our ICC2, which may affect the reliability of team means (Klein & Kozlowski, 2000). Although, other studies with low average team sizes report similar ICC values (Hofmann & Jones, 2005: 513; Chen & Bliese, 2002: 551; Dong, Bartol, Zhang, & Li, 2017: 446), we suggest that the results have to be interpreted having this limitation in mind. Finally, while we

did control for East vs West culture, it is also possible that organizational variables have some effects on individual and team creativity.

We suggest several more opportunities for future research. First, as this study is the first to test a multilevel model of IPO and CPO, more research is needed to better understand the complex relationship between IPO and CPO. Like Pierce and Jussila (2010), we have not addressed "whether and/or when the development of these two psychological states is sequential or simultaneous in nature" (p.829). We have provided a snapshot of the co-existence of two types of ownerships and found that individuals can experience different levels of both types of ownerships and that both types of ownership are important team properties. We believe that understanding the dynamics between how those two states are changing over the course of a project is a very interesting question for the future research. Diary or multi-wave longitudinal studies could capture differences in these dynamic relationships across the different stages of a project's life cycle. Although we could not obtain the data on the project stage, we believe this is an important factor that should be considered in development of IPO and CPO as well as the relationship between them. Overall, we believe that the sense of ownership will become stronger the more has been invested in a project, and this is likely to be a function of time. Watson, Johnson, & Merritt (1998) found that team and self-oriented behaviors indeed change within teams over time. Furthermore, the extent to which either collective, individual or both ownerships grow more strongly is likely to depend on overall quality of team processes states such as cohesiveness and team identity.

Second, in order to introduce the distinction between the constructs gradually and examine whether the effects unfold or not in a homologous fashion, we focused on team mean IPO and CPO. We suggest further studies should examine the more nuanced effects of different team configurations such as how the maximum (the highest score in the team), the minimum (the

lowest score in the team), and the standard deviation (the amount of variation in the team) affects team engagement and creativity[3].

In addition to team composition, we also explored whether individual and collective ownership interacted at either the individual, team, or cross-level but we did not find any support for this alternative approach. We can't off course entirely rule out an interaction between these two constructs given the relatively sample size and the difficulty in detecting interactions (McClelland & Judd, 1993), and future research should further examine a possible interplay between these variables.

Third, it is important to understand the conditions under which the negative effect of IPO on team engagement can be mitigated. Similarly, are there conditions under which individual perceptions of CPO could lead to less engagement and less individual efforts in creativity? In this study, we captured individual engagement in the same project, but we did not examine the consequences of CPO on individual pursuits outside the targeted project. In such circumstances, it is more likely that the tensions between collective affiliation and individual self-expression will be magnified, as individual engagement in other projects will be at odds with the contribution

[3] For exploratory purposes we ran initial tests in our data and found that maximum value of CPO had a significant effect on team engagement ($\gamma = 1.78$, $p = .015$). Interestingly, we also found that maximum value of IPO had a positive effect on team engagement ($\gamma = 4.70$, $p = .001$), while the effects of latent mean IPO ($\gamma = -10.58$, $p = <.001$) and latent mean CPO ($\gamma = 2.06$, $p = .004$) remained the same in relation to its patterns of significance. In relation to the tests of the minimum value we found a significant positive effect for the lowest score of IPO in the team ($\gamma = 4.12$, $p = .005$) on team engagement while the lowest score of CPO did not have a significant effect. When exploring the variance of individual scores within the team, we did not find the effect of *team standard deviation* of IPO to be significant, but we found a negative significant effect of *team standard deviation CPO* on team engagement ($\gamma = -2.57$, $p = .018$). This analysis however is purely exploratory and such assumptions require further empirical investigation and theoretical elaboration. We thank the anonymous reviewers for their suggestion to examine the data in this fashion.

towards a focal project, thus making it more likely to find the negative effect we first hypothesized.

Fourth, to further establish the discriminant and predictive validity of CPO and IPO is important examining how different types of PO relate to other important work behaviours. For instance, Lean and colleagues (2009) when studying individual and collective job crafting report a similar pattern of relationship with turnover intentions, but the relationships with job satisfaction were in opposite directions. It is possible that at the individual level CPO is a better predictor of collective oriented behaviours such as organizational citizenship behaviour, and IPO but not CPO drives self-oriented behaviours such as knowledge hiding or territoriality. This is yet to be explored.

Finally, in this study we treated PO as an independent variable but little is known about its antecedents. Future research is needed to examine whether different antecedents exist for IPO and CPO. For instance, we suggest investigating whether individual and team identity, instrumentality of the project (benefits in case of project success), shared understanding of a project problem, and goal independence, differently affect IPO and CPO in project teams.

***Practical Implications***

Managers can apply these findings to better understand how our nature to possess materializes in project contexts and how individual and team effort can be maximized. The results suggest that when individuals feel personal ownership towards the project they tend to invest more effort, be dedicated to the project and contribute with more creative ideas. However, the study also shows that such personal ownership, while stimulating individual contributions, does not stimulate team effort, but actually has the opposite effect. If managers are seeking to enhance team members supporting each other, speaking enthusiastically about the project and persisting in

face of difficulties, they should equally think of promoting "Ourness" – the feeling that the team is the owner. Alternatively, if only IPO is promoted, although team members will still demonstrate their individual efforts and creativity, the team as a collective will not leverage them, resulting in lower team engagement and creativity.

**Conclusion**

Taken together, these results present a compelling portrait of the multilevel nature of PO. We have demonstrated the distinctiveness of CPO from IPO. We found that CPO is positively related to team-level outcomes, namely team engagement and, indirectly, team creativity, while IPO has negative effects on team engagement, which indirectly negatively affects team creativity. Both IPO and CPO had positive effects on individual engagement and, indirectly, individual creativity. Involving both IPO and CPO at both the individual and team level in future studies, would offer a more realistic and comprehensive approach in studying individual and team work behavior.

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**Tables**

Table 1. Definitions of Individual and collective psychological ownerships.[1]

| Level | Individual psychological ownership (IPO) | Collective psychological ownership (CPO) |
|---|---|---|
| Individual | Individual (personal) ownership is a feeling that something belongs to me and I am an owner, e.g. "I think this is my project." | Individual's perception of team's feeling that the target of ownership belongs to the group. E.g. "My colleagues and I collectively feel this is our project." |
| Group | Average levels of individual ownership in the team. Considered a configural (Kozlowsky & Klein, 2000) team property - no consensus amongst group members needed. | Collective psychological ownership is the collectively held sense (feeling) that this target of ownership (or a piece of that target) is collectively ''ours.''(Pierce & Jussila p.812). Considered a shared team property (Kozlowsky & Klein, 2000) - consensus between group members needed. |

**Table 2**. CFA: testing the distinctiveness of individual and team level constructs IPO, CPO, engagement and creativity.

| Level 1 CFA | $\chi^2$ | df | SRMR | CFI | RMSEA |
|---|---|---|---|---|---|
| 1. Hypothesized four-factor model: IPO, CPO, engagement, creativity. | 150.45 | 70 | .08 | .95 | .08 |
| 2. Three-factor model: IPO and CPO collapsed into one factor | 206.67 | 73 | .10 | .91 | .10 |
| 3. Two-factor model: All T1 constructs (IPO and CPO) and T2 (engagement and creativity) collapsed into one factor | 352.70 | 75 | .12 | .82 | .14 |
| 4. One-factor model: All constructs were combined into one factor | 653.75 | 76 | .19 | .63 | .20 |
| **Level 2 CFA** | $\chi^2$ | df | SRMR | CFI | RMSEA |
| 5. Hypothesized four-factor model: IPO, CPO, team engagement, team creativity | 67.82 | 58 | .10 | .98 | .06 |
| 6. Three-factor model: IPO and CPO into one factor | 115.86 | 61 | .12 | .89 | .15 |
| 7. Two-factor model: Team member constructs (IPO and CPO) and team manager rated constructs (engagement and creativity) into one factor | 171.96 | 63 | .14 | .77 | .20 |
| 8. One-factor model: All constructs combined into one factor | 244.91 | 64 | .21 | .63 | .26 |

N (level 1) =186, N (level 2) = 39. CFI = comparative fit index, RMSEA = root-mean-square error of approximation, SRMR = Standardized root mean square residual.

**Table 3**. Descriptive statistics, correlations and scales' reliabilities.

| Individual-level variables | M | SD | 1 | 2 | 3 | 4 | |
|---|---|---|---|---|---|---|---|
| 1. T1 (E) Tenure in the project | .78 | .64 | | | | | |
| 2. T1 (E) IPO | 3.83 | 1.62 | .05 | (.89) | | | |
| 3. T1 (E) CPO | 4.96 | 1.68 | -.09 | .53** | (.94) | | |
| 4. T2 (E) Individual engagement | 5.31 | 1.17 | .03 | .26** | .31** | (.92) | |
| 5. T2 (E) Individual creativity | 5.54 | .84 | .06 | .12 | .11 | .56** | (.75) |
| Team-level variables | M | SD | 1 | 2 | 3 | 4 | 5 |
| 1. T1 (R) Team size | 5.64 | 4.67 | | | | | |
| 2. T1 (R) Culture source | 1.31 | .47 | -.33* | | | | |
| 3. T1 (E) Group-mean IPO | 3.98 | 1.12 | -.31** | .58** | (.92) | | |
| 4. T1 (E) Group-mean CPO | 5.25 | 1.18 | -.50** | .59** | .77** | (.93) | |
| 5. T2 (M) Team engagement | 5.11 | 1.16 | .12 | -.36* | -.06 | .01 | (.92) |
| 6. T3 (M) Team creativity | 5.66 | .91 | -.002 | -.06 | .17 | .17 | .41* (.86) |

*Note.* N=157-186, N (Team) = 39; Culture source 1= West (UK, US, Lithuania), 2= China; Time lag between intervals T1, T2 and T3 was 3 weeks; Project tenure 1 month = .08. E – Employee data, M – manager data, R – company records; *p< .05, **p< .01.

**Table 4**: Estimation of individual and group level indirect effects

| | Coefficient | SE | 95% CI |
|---|---|---|---|
| Individual level | | | |
| IPO → Individual engagement → Individual creativity | .06** | .02 | [.0142 .1095] |
| CPO → Individual engagement → Individual creativity | .09 ** | .03 | [.0402, .1554] |
| Group level | | | |
| Group IPO → Team engagement → Team creativity | -2.24* | 1.16 | [-4.927, -.3448] |
| Group CPO → Team engagement → Team creativity | 1.64* | .86 | [.2282, 3.626] |

*Note*. Unit level N=39, Individual level N = 163; CI - confidence interval; * $p < .05$, ** $p \leq .01$.

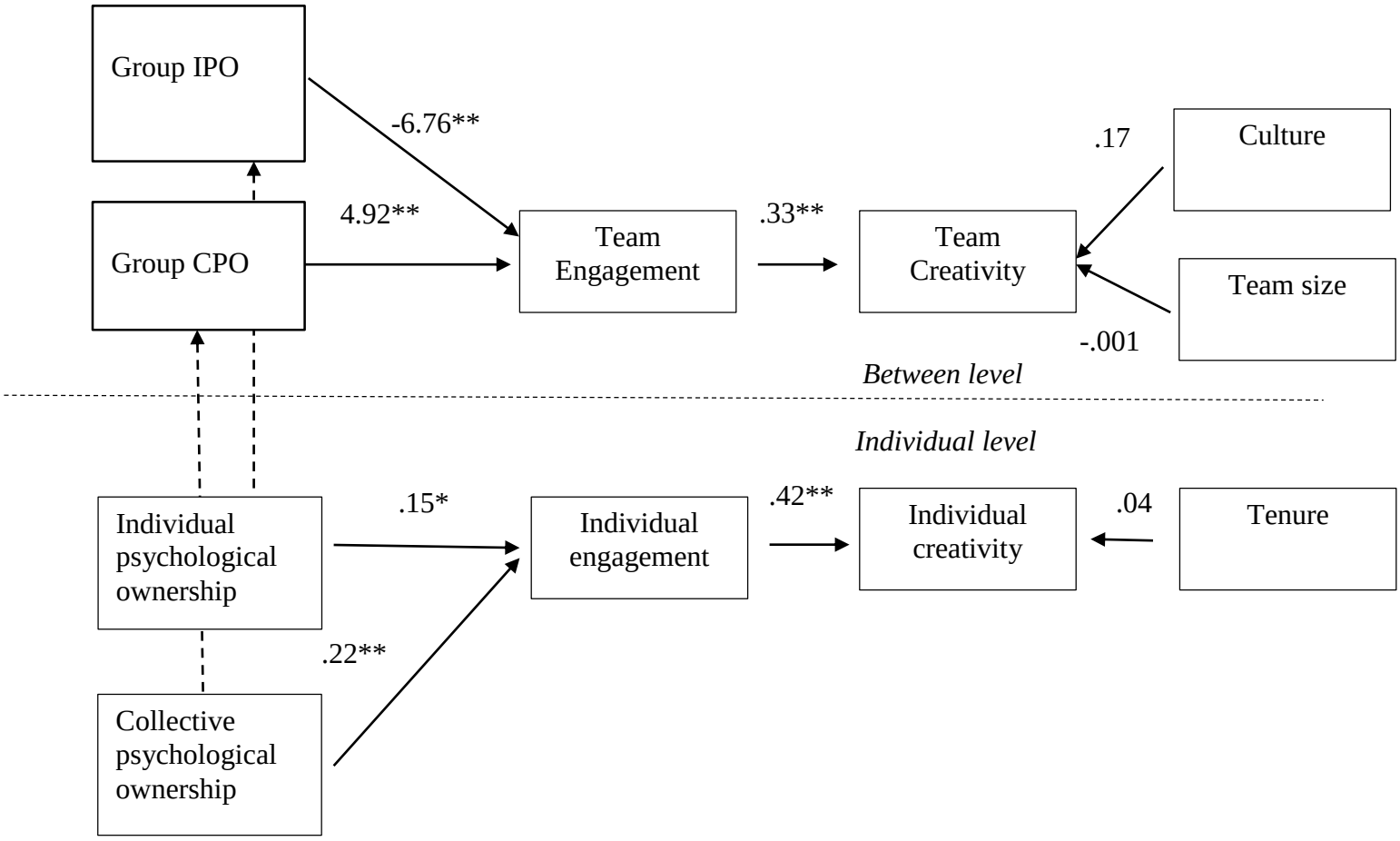


Figure 1: Results of the hypothesized multilevel model of processes and outcomes of psychological ownership. * $p < .05$, ** $p \leq .01$.

# Appendix

## Individual Psychological Ownership

IPO1. This is MY project.
IPO2. I sense that this project is Mine.
IPO3. I feel a very high degree of personal ownership for this project.
IPO4. When I work on this project it feels as though I own it.

## Collective Psychological Ownership

CPO1. My colleagues and I collectively sense that this project is OURS
CPO2. My colleagues and I collectively feel a very high degree of team ownership for this project
CPO3. Most people that work for this project feel as though they own the project