Becoming a PI: From ‘doing’ to ‘managing’ research

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Becoming a PI: From ‘doing’ to ‘managing’ research

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ABSTRACT

While achieving research independence by becoming a principal investigator (PI) is a key aspiration for many postdocs, little is known of the trajectory from PhD graduation to first PI grant. This interview-based study examined how 16 PIs in science, technology engineering, mathematics or medicine, in the UK and continental Europe, prepared for and dealt with this career transition. Individuals demonstrated commitment to lengthy periods of postdoctoral work in a range of institutions (often involving international mobility) to achieve PI-status. Their emotionally laden journeys required resilience and self-belief, since getting a grant was conceived as partly luck. Once individuals had their grant they faced new challenges that distanced them from actively researching. Still, individuals navigated their intentions in a sustained fashion to create a distinct intellectual profile in the face of challenging circumstances. The results highlight the centrality of emotion in the journey, as well as curricular imperatives for both doctoral and postdoctoral learning.

Context

Research into the postdoctoral period is still quite limited in comparison with doctoral education (Evans 2011), despite the postdoctoral period being increasingly viewed as a key step in achieving a pre-tenure position (Nir and Zilberstein-Levy 2006). What we do know, based largely on surveys is that postdocs experience job insecurity, a lack of career structure and few permanent positions, with the postdoc period getting longer (Scaffidi and Berman 2011; van der Weijden, Teelken et al. 2015), in fact, it is becoming more a career than a transition.

Regardless of this context, postdocs wanting to remain in academia view the period as one in which they develop their scholarly profiles, with becoming a principal investigator (PI) a key aspiration in demonstrating research leadership (Kolb, Klappstein, and Tonner 2012). This study reports the experiences of 16 PIs in science, technology engineering, mathematics or medicine (STEMM) who aspired to and became PIs. The decision to focus on a specific disciplinary cluster rests on there being differences across disciplinary groups (van der Weijden, Belder et al. 2015). This cluster was chosen given they clearly exemplify the challenges experienced by postdocs.
Conceptual framework

This study is situated within a workplace learning perspective premised on the notion that while the workplace offers an environment in which to learn key elements of practice, individuals choose the degree to which they participate, modify or refuse to participate (Billett 2006).

Identity-trajectory and growing independence

As regards academic work specifically, a key shift for PhD graduates remaining in the academy (Laudel and Glaser 2008) is increasing independence as researchers. We characterize this as the development of an identity-trajectory (McAlpine, Amundsen, & Turner 2014) which integrates a unique intellectual profile situated within and recognized by a growing network of local and international colleagues. In other words, in the academic workplace, it is the academic network globally, not just the institution in which an individual is located, that constitutes the ‘workplace’ in which individuals learn and work to develop their profiles. Still, such extended support is not sufficient to advance one’s goals; also necessary is the ability to draw on formal and informal institutional resources (McAlpine, Amundsen, & Turner 2014).

From the perspective of identity-trajectory, developing independence is demonstrated in agency over time: individuals articulating and working towards personally chosen academic (as well as personal1) intentions and goals and, in doing so, developing and drawing on the support of extended and local networks (McAlpine, Amundsen, & Turner 2014). An additional aspect of individual agency is dealing positively with expected as well as unexpected changes and challenges, particularly in the context of the academic rejection culture (Baruch and Hall 2004). This ability to deal positively with challenges requires resilience: the capacity to adapt successfully to, and to bounce back from, adverse circumstances. Resilience encompasses a positive emotional response to stress – in which motivation, intention, the intellectual and the emotional are intertwined (e.g. Nardi 2005). Such resilience contributes to enduring commitment which enables resistance to future negative events (Day 2008), especially important for researchers with limited chances of achieving a permanent position, dependent instead on contingent positions (Felt, Fochler, and Müller 2012). References to these aspects of identity-trajectory are evident in the literature on postdocs and research leaders. For instance, Browning, Thompson, and Dawson (2011) refer to the need for initiative, as well as perseverance and resilience in becoming a research leader; Kyvik (2013) and Browning, Thompson, and Dawson (2011) to the need for an extended network of influential colleagues within one’s discipline; van der Weijden, Teelken et al., (2015) to developing a unique intellectual trajectory – a ‘creative research niche’.

Demonstrating leadership (and management)

An additional perspective is that the movement from postdoc to PI is a significant leadership transition (Kolb, Klappstein, and Tonner 2012) – articulated as becoming team leaders (van der Weijden, Teelken et al. 2015), lab leaders (Felt, Fochler, and Müller 2012) and research leaders (Browning, Thompson, and Dawson 2011). Browning,
Thompson, and Dawson (2011) described leadership by distinguishing it from management, that is, what it is not. This dichotomy was also reported in looking at academic leadership amongst academics (Bolden et al. 2012).

Browning, Thompson, and Dawson (2011) characterized management as more operational, more focused on the present – on how to achieve goals, ensuring the unit functions effectively and efficiently. Management often involved a formal position, with responsibility to see things are done right; Bolden et al. (2012) noted tasks and processes like financial and personnel issues.

Leadership was viewed as more strategic, with a greater focus on the future, and included articulating a vision (Browning, Thompson, and Dawson 2011). Whether formal or informal, leadership involved asking why. Bolden et al. (2012) noted inspiring others, modeling exemplary intellectual standards, mentoring. While Bolden et al. (2012) asserted management and leadership were distinct but complementary, participants in their study reported that management could undermine leadership, particularly when institutional agendas stressed accountability, for example, alignment with institutional ‘brand’ or performance, which narrowed attention to targets.

The distinction, and potential complementarity, between leadership and management is useful in analyzing the findings from three studies on the perceptions of academic researchers as to the abilities central to being a research leader. The UK survey (Vitae 2011) of PIs and research leaders asked respondents to rate the importance of a range of research-related activities in becoming research leaders. The four chosen as ‘very important’ by over 80% of respondents demonstrate independence and success as a researcher: (a) developing a research area, (b) securing research funding, (c) maximizing outputs, and (d) preparing research proposals. These responsibilities demonstrate leadership in the field, but also require some management abilities. Most respondents also chose the following activities as ‘important’ in building their profile: ‘supervising doctoral students’, ‘building a group’, ‘motivating individuals’, and ‘managing performance’. ‘Building a group’ and ‘motivating individuals’ might be considered both leadership and management, but, ‘performance’ clearly represents management; they felt much less confident about their ability to do these three.

Kyvik’s (2013) longitudinal survey of Norwegian researchers substantiated the Vitae findings, though offering a slightly longer list of responsibilities: (a) applying for funding, (b), ensuring results are published, (c) keeping in touch with other groups working on the same problem, (d) directing and supporting the work of the group including students, (e) overseeing timetables and budgets, and (f) exercising quality control. As with the Vitae study, leadership and some management is represented in: (a) applying for funding, (b), ensuring results are published, and (c) keeping in touch with other groups working on the same problem. Management is represented in: (d) directing and supporting the work of the group (though there could be elements of leadership here), (e) overseeing timetables and budgets, and (f) exercising quality control.

Browning, Thompson, and Dawson (2011) qualitative study noted a similar list of responsibilities as well as perseverance and resilience: establishing one’s own group, good international networks, supervising and publishing with students, and participating in collaborative research. Interestingly, they did not name any specific management abilities, though management would be embedded in what they noted. The invisibility of the role of management was also the case in the postdoc participants in the qualitative study by
Felt, Fochler, and Müller (2012). It is possible the management responsibilities emerged in the Kyvik and Vitae studies only because they were offered as options in the drop-down lists.

**Synthesis**

Clearly funding, maximizing outputs and engaging with others internationally are critical to developing research leadership. However, despite these consistent findings, an international survey of postdoctoral supervisors suggests that postdocs may not be well supported in these responsibilities: while two-thirds of supervisors saw the postdoc as developing independence, only a third felt learning how to write grants and obtain funding important to postdoc experience (Bonetta 2011). This suggests that postdocs need to be agentive in advancing their intellectual profiles, networks, and careers. Interestingly, postdocs may take little advantage of institutional forms of support, for example, workshops (Scaffidi and Berman 2011; van der Weijden, Belder et al. 2015) – though why is unclear. In sum, there appears to be some consistency as to the responsibilities necessary to develop and demonstrate research leadership – with the role of management responsibilities much less visible. Individuals need to be agentive, and develop resilience and perseverance to deal with the emotional challenges of progressing careers – though, to date, emotion has been underplayed in the literature.

**Objectives**

In this context, the research asked two specific questions:

1. How do researchers experience working towards achieving the leadership transition?
2. What are the challenges faced by PIs as they transition from doing research under supervision to having autonomy to achieve their goals?

**Methodology, participants, data collection, and analysis**

**Methodology**

The study draws on a narrative tradition (Reissman 2008), and is unusual in this tradition in looking across numbers of individuals, rather than just one or two. Narratives make connections between events, show the influence of the passage of time in carrying the action forward, and demonstrate the goals and intentions of individuals (Coulter and Smith 2009). The underlying premise is that narratives represent constructions of identity (Riessman 2008).

**Recruitment**

In two research-intensive universities, one in continental Europe and the other in the UK, participants were recruited via email. They were invited to respond if they self-defined as meeting the following criteria:

- In the last 5 years, you have been awarded grant funding in your own right for the first time (not including personal fellowships)
You are supervising others
You have overall responsibility for the intellectual leadership and overall management of the research project.

Participants

Eight STEMM scientists from each university (16 in total, 5 females and 11 males) form the basis for the analysis. Using different national contexts seemed important given the association between researcher mobility and career progression (Felt, Fochler, and Müller 2012). Participants were interviewed in English at a location of their choice between December 2013 and June 2014. Most were between 31 and 40. At the UK university, about two-thirds had English as another language, and at the European university about half did not have the mother tongue of the country (see Table 1).

Data collection

Data collection principally involved an in-depth interview that incorporated the construction of a journey plot. Journey plots are a visual data collection method well suited to capturing experiences and related emotions through time (Miller and Brimicombe 2003) – and are thus particularly suitable for a narrative approach with its focus on agency, motivation, and related emotion. The journey plot template showed the progress of time on the horizontal axis from left to right and the variation in related emotion from high to low on the vertical axis (top to bottom) – with the mid-point marked. At the start of the interview, participants were asked to map the emotional highs and lows of their experiences from PhD graduation to their first PI grants. Immediately afterwards, they re-constructed the journey orally, expanding on the meaning and complexity of the different events and related high and low points on the journey plot. The combination of visual and dialogic information allowed us to grasp the chronology as well as a sense of the relevance of the emotional aspects of the experiences, essential to capturing possible

Table 1. Overview of participants.

<table>
<thead>
<tr>
<th>Pseudonym, gender</th>
<th>Age</th>
<th>PhD graduation</th>
<th>Field</th>
<th>Number of posts before present one &gt; title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Juliet, f</td>
<td>36–40</td>
<td>2008</td>
<td>Engineering</td>
<td>0 &gt; Lecturer</td>
</tr>
<tr>
<td>Frances, f</td>
<td>36–40</td>
<td>2008</td>
<td>Materials engineering</td>
<td>2 &gt; Lecturer</td>
</tr>
<tr>
<td>Mike, m</td>
<td>36–40</td>
<td>2006</td>
<td>Dynamic systems</td>
<td>4 &gt; Senior Lecturer</td>
</tr>
<tr>
<td>Pedro, m</td>
<td>26–30</td>
<td>2009</td>
<td>Computational fluid dynamics</td>
<td>1 &gt; Lecturer</td>
</tr>
<tr>
<td>Laura, f</td>
<td>41–45</td>
<td>2006</td>
<td>Medicine</td>
<td>4 &gt; Lecturer (second lecturer post since she moved)</td>
</tr>
<tr>
<td>Fabien, m</td>
<td>36–40</td>
<td>2004</td>
<td>Chemical biology</td>
<td>3 &gt; Associate Professor</td>
</tr>
<tr>
<td>Romeo, m</td>
<td>36–40</td>
<td>2005</td>
<td>Mathematics</td>
<td>1 &gt; Associate Professor</td>
</tr>
<tr>
<td>Will, m</td>
<td>31–35</td>
<td>2007</td>
<td>Molecular Biology</td>
<td>2 &gt; PI/Fellow</td>
</tr>
<tr>
<td>Greg, m</td>
<td>36–40</td>
<td>2006</td>
<td>Cancer research</td>
<td>4 &gt; Group Leader</td>
</tr>
<tr>
<td>Geoff, m</td>
<td>36–40</td>
<td>2006</td>
<td>Neuroscience</td>
<td>2 &gt; Lecturer</td>
</tr>
<tr>
<td>Fiona, f</td>
<td>31–35</td>
<td>2008</td>
<td>Immunology, genomics</td>
<td>1 &gt; Assistant Professor and researcher</td>
</tr>
<tr>
<td>Cathy, f</td>
<td>31–35</td>
<td>2006</td>
<td>Structural engineering</td>
<td>2 &gt; Lecturer</td>
</tr>
<tr>
<td>Dan, m</td>
<td>36–40</td>
<td>2004</td>
<td>Microbiology</td>
<td>3 &gt; Pre-tenure</td>
</tr>
<tr>
<td>Sam, m</td>
<td>36–40</td>
<td>2005</td>
<td>Chemistry</td>
<td>3 &gt; Associate Professor</td>
</tr>
<tr>
<td>Victor, m</td>
<td>31–35</td>
<td>2006</td>
<td>Physics</td>
<td>2 &gt; Associate Professor</td>
</tr>
<tr>
<td>Jerry, m</td>
<td>36–40</td>
<td>2000</td>
<td>Astronomy</td>
<td>1 &gt; Assistant Professor</td>
</tr>
</tbody>
</table>
relationships between intentions and emotions. Following this, individuals were asked to describe their experience of being a PI (daily activities, challenges, institutional support available, etc.) and finally any advice they would offer to individuals starting on a similar journey. After the interview, individuals completed a short biographic questionnaire and provided a CV. This analysis focuses principally on the first part of the interview, working towards achieving PI status, as well as aspects of the second part, the key challenges of being a PI.

**Analysis**

The data were analyzed thematically in a manner common in narrative research which involves ‘keeping a story intact by theorizing from the case rather than from component themes across cases’ (Riessman 2008, 53). This is different from thematic analysis common in other research traditions where analysis proceeds by theme across individuals. The first step was to reduce and still display the scope of the data for each individual. This was done by creating case summaries integrating the interview, the journey plot, the biographic information and the CV: reduced low-interference descriptions of each participant’s account remaining as close as possible to the participant’s own voice.

This made it possible to understand the individual trajectories before looking across the cases seeking patterns of experience. As regards the journey plots in particular, it was possible to look for patterns in emotional experiences by identifying the tempo (the speed at which changes occurred through time) and intensity (the emotional power) of each experience.

**Results**

Before describing the results related to the two research questions, a cameo of one individual, Romeo, provides a sense of the emotional nature of one journey, unique but representative of the need for mobility, commitment and resilience as well as from his perspective, some luck.

Romeo, European, mid-to-late 30s, was prepared to travel to work with and learn from key thinkers in his field. So, he moved from Europe to North America to do his PhD which was an emotional high personally even though he experienced serious research challenges. Fortunately, luck – “being at the right place at the right time” – meant he overheard a discussion that led him to his thesis. Completing the degree, he applied for 40–50 postdoc positions, but noted that where he ended up resulted from colleagues in one place talking to colleagues at another and recommending him: “you only get offers anyway from places where people know you.” Early in in this first postdoc, he presented a well-received paper from the thesis; again, “the timing was, by chance, I was lucky” to get the attention he got. This led to a paper for which he is still cited. After this first postdoc in North America, he went to Latin America for a second before returning to his home country when a senior colleague wrote a fellowship application with him in mind. He was also offered a permanent position in another European country but turned it down, partly due to personal reasons. Once returned, he applied for a national new researcher grant and was rejected. But his second application was thankfully successful as he could only apply twice. This provided funding for his salary, but not for a team. Then, he applied for the next level of grant, feeling very pressured as he had been told that getting the grant would help with getting tenure. Given there was no guarantee of success, he found the time it took to write the proposal
de-motivating. He even thought he might give up research if he didn’t get the grant. Thankfully, he was successful and now finds himself doing many things beyond research: “a typical thing is to say … you will work 80% on research. There is no way I’m doing 80% research, … certainly not during … regular work hours … I do research at home, at night and in the weekend … I mean, there’s teaching, there’s students, there’s committees … in the end, there is not 80% left for research!”

With Romeo’s journey as background, the answers to the research questions are presented below and incorporate discussion.

**1. How do researchers experience working towards achieving the ‘leadership transition’ to ‘PI’?**

Of note, the time span from graduation to achieving PI status was five to seven years, considerably longer than the time reported in Bonetta (2009) in which 76% of postdoc positions lasted from one to three years and 19% four plus years.

In the accounts about their journeys, five (Laura, Fabien, Romeo, Greg, Geoff) began their accounts with reference to their PhD work; they all described serious challenges they had experienced during the degree, such as re-direction of their research or institutional re-locations, sometimes to different countries. The remainder began their accounts with graduation.

**Mobility and re-locations**

Overall, individuals demonstrated mobility in advancing their career opportunities (Felt, Fochler, and Müller 2012). They sought postdoc positions globally, moving to research-intensive universities in North America, Latin America, and Europe. While such mobility across institutions and national boundaries demonstrated considerable adaptability, these geographical and institutional (as well as cultural and sometimes linguistic) re-locations had substantial physical, social, and psychological implications for both work and personal lives (McAlpine 2012). More specifically, as regards research they needed to learn how to effectively negotiate new funding regimes and research genres – as well as new institutional expectations.

Generally, those who had spent time in the USA commented in positive ways about the academic and research climates there in relation to the more constrained ones in continental Europe and the UK. This comparison was likely partially influenced by different modes of research funding in the European and North American contexts (Cantwell 2011). Thus, Will reported better job prospects; Fiona, a better work environment; Pedro, Jerry, Romeo, and Laura, different research practices related to grant proposals and ethics; and Romeo and Geoff, a better work-life balance. Their more positive view of the US academic environment echoes that reported in a comparative study (Jones et al. 2012) of junior academics: those in the USA are generally more satisfied with the work environment than those in other countries (except for Canada).

Institutional moves also enabled organizational comparisons, so individuals became much more aware of variation in institutional pressures and departmental politics. A few (e.g. Pedro, Fiona, Juliet) also experienced the challenge of networking and intellectual re-locations (McAlpine 2012), which occurred when they moved, often intentionally, outside of their specialisms, methodologies and research themes in joining new teams.
Thus, they experienced a period in which it was difficult to contribute since they did not yet share a common research perspective or discourse with their new colleagues.

**Demonstrating agency, independence, and managing emotions**

During this postdoc period, individuals reported two goals: gaining research funding and a position leading to permanence. As regards the former, they all shared a similar European Union (EU) context so had access to a common funding agency which offered a series of awards for those within a certain number of years of graduation, for example, Marie Curie. As well, each country had funding councils with funding for early career researchers, often including the terms ‘career development’ or ‘leadership’ or ‘starting grant’. In nearly all cases, individuals were applying for both national and EU grants. Furthermore, both institutions also offered smaller amounts of money and sometimes fellowships to support research.

These postdocs were not only trying to master the local/national genres or proposal writing, but also to write proposals that presented a unique focus, a criterion important to reviewers (Porter 2005). Their strong focus on grant writing suggests they had to be agentive given Bonetta’s (2011) finding that most supervisors did not view learning how to write grants and obtain funding important to postdoc experience. All described ways to enhance their chances of success. Generally, these involved actively seeking feedback on the proposal informally from their developing networks both departmentally and externally, with individual practices differing: feedback from specialist peers (most individuals), feedback from non-specialist researchers to emulate potential reviewers (e.g. Will, Fiona), discussing the research goal (e.g. Juliet). As well, when the proposal process involved two rounds, then individuals arranged for mock interview feedback (e.g. Mike, Pedro, Dan). They rarely referred to drawing on formal institutional support, also reported by Scaffidi and Berman (2011) and van der Weijden, Belder et al. (2015). One wonders to what extent this behavior may be linked to the emphasis on independence.

Despite their efforts, a ‘problem that is recurrent … [is] that you never know what … people judge you on [so getting a grant involved] … having a good angel’ (Sam). In fact, more than half invoked some form of ‘luck’ (or ‘bad luck’) for their (lack of) success. This is not perhaps surprising given the evidence that luck plays a role in success (van Arensburgen and van den Besselaar 2012). In such circumstances, invoking luck is a means to maintain commitment, a belief in self, as well as mediate the competition between themselves and their colleagues.

In looking at their journeys in terms of the emotional experiences, the findings provide a sense of the integration of emotion and work-related activities as well as the importance of resilience in dealing with lack of success. Often graduation was experienced as a positive experience with a dip shortly afterwards experienced by about half when individuals began to deal with the challenges of the journey ahead. In addition to graduation, the highs referred to, for instance, getting a grant (e.g. Romeo), having a paper accepted in a good journal (e.g. Greg), finding a productive group/environment (e.g. Mike), and getting enough results to be able to apply for a grant (e.g. Juliet). The lows referred, for instance, to seeking a new direction post-graduation (e.g. Victor), having a proposal rejected (e.g. Cathy), job-seeking (e.g. Victor), the time it takes to write a proposal with no guarantee of success (e.g. Romeo). Other low points included geographical, cultural,
and linguistic re-locations (e.g. Will and Fiona, difficult re-adaptation to the EU after US experience) as well as issues related to their personal lives (e.g. Frances, navigating work and childcare).

In looking across the 15 journey plots (Sam listed events but did not plot the highs and lows), there was one prevailing pattern evident in about half the individuals: multiple highs and lows above and below the mid-point with the final point an upward one (Geoff, Laura, Mike, Dan, Romeo, Fabien, Victor); in other words, the pattern was one of relatively high tempo (speed of change) and high intensity (emotional power of experiences) (Figure 1).

A striking pattern shared by only two, Jerry and Fiona, was a journey of medium tempo and low-to-medium intensity but still overall emotionally downward, beginning above the mid-point but gradually dropping below or to the mid-point.

Other patterns were:

- For three, a consistent upward trend (with low tempo) with very small dips (low intensity): Frances, Pedro, and Greg, with Frances and Pedro beginning and remaining above the emotional mid-point
- For two, a number of ups and downs (relatively low tempo) remaining around the mid-point (low intensity), so not demonstrating the extremes of emotions in the majority group: Juliet and Will
- Cathy’s plot was unusual in that while she experienced high intensity, the tempo was extremely low.

These individuals’ ability to recognize and describe their emotional responses to specific instances of their efforts to be successful in academic work demonstrates the intertwined nature of motivation, intention, emotion, and intellectual thought (Nardi 2005). It is a reminder that while emotion is often overlooked in higher education, it is essential to understanding sustained commitment to work (Neumann 2006).

![Figure 1. Romeo’s journey plot (adapted from original to exclude personal details).](image-url)
Synthesis
Overall, during this period, individuals demonstrated their agency by expressing clear goals they were working towards, sometimes on their own and often with the help of others as they called on a developing inter-personal network both departmental and extended (McAlpine, Amundsen, & Turner 2014). Individuals said things like: ‘believe in yourself’, ‘know where you’re going’, and ‘have a vision’. They were seeking to develop and advance their unique intellectual profile (also reported in McAlpine (2014) about a different group of scientists). Individuals referred to this work as developing (or deviating from) a research direction that, while related, was distinct from the PhD – and making this direction evident in publications. A few described what they were doing as somewhat of a risk, though necessary, in order to be attractive to grant funders.

Their focus on a unique research direction and evidence of it in publications reflects the research activities that PIs in the Vitae (2011) survey and researchers in the Kyvik (2013) study viewed as important in becoming effective research leaders. Lastly, since achieving their goals often included dealing with sustained challenges and related negative emotions, I would argue individuals demonstrated resilience, the ability to bounce back from difficulties, which Baruch and Hall (2004) describe as essential to academic success. The only individuals where such resilience might be in doubt are Jerry and Fiona whose emotional trend was slowly downwards.

2. What are the challenges faced by PIs as they transition from doing research under supervision to having autonomy to achieve their goals?

It was striking how surprised individuals were at the way the new role influenced their work and responsibilities; it appeared they had given little thought to the transition – just as PhD students generally focused on completing the degree, give little thought to the post-graduation period (McAlpine and Turner 2012).

Emotions, transition, and managing research
Thus, though getting the grant was a positive experience, individuals found themselves dealing with a new challenges (not doing ‘what I thought I would be doing’ (Juliet)) which many characterized as a shift in perspective from ‘doing’ to ‘managing’ research – ‘become a manager’ (Sam). All but Romeo and Will described a range of responsibilities they had to take on that they were not prepared for: managing the grant (Jerry), dealing with people (e.g. Frances, Fiona), managing the team (e.g. Pedro, Fabien, Jerry), line managing individuals (e.g. Laura, Cathy) as well as setting priorities amongst tasks (e.g. Mike), negotiating the ‘political’ environment (e.g. Fabien), developing a management style (e.g. Greg, Geoff, Victor), getting people to do things they don’t want to do (e.g. Dan). These responsibilities clearly reflect the management responsibilities in the Kyvik (2013) study: directing and supporting the work of the group including students, overseeing timetables and budgets, and exercising quality control. They also reflect the management responsibilities that those in the Vitae (2011) study reported they had less confidence doing: building a group, motivating individuals, and managing performance.

Like those in Bolden et al.’s (2012) study, they viewed management responsibilities somewhat negatively, though for different reasons: they were not seen as integral to their research interests and, in fact, took time away from what they valued. Though
training related to management issues was sometimes available, this was not necessarily viewed as helpful – as earlier, demonstrating a lack of connection to formal institutional resources. (Still, a number commented positively on the human resource support available for managing the financial aspects of the grant.)

There was minimal explicit reference to the kinds of activities that constitute leadership, perhaps because these were core to developing their scholarly profile and had already been well developed and demonstrated, so were not experienced as new challenges. Still, there was a growing awareness that they could not sit back after getting their first grant – the need to apply for funding was a never-ending process. As Juliet noted, ‘in order to get money, I need to do good research and have good ideas … So, money is a big concern, research is a big concern, and at this point, they just kind of just mingle together’.

Overall, it appeared that while all viewed becoming a PI as an important and positive step, the aftermath of gaining funding involved new management challenges – ones they had not been prepared for – which raises concerns regarding their doctoral preparation and the nature of postdoctoral support, which I return to later. Notably, there appeared to be divergent emotional responses to this shift in responsibility and disconnect from research. Many commented on feeling somewhat disappointed that they were becoming distanced from the personal investment that had led them to become researchers. And there were some concerns that success would lead to larger and larger teams. This was particularly noted by the two whose emotional journeys went steadily downwards: for Jerry, the team becoming too big to manage, and for Fiona, the inter-disciplinary team too complex to manage. Still, a few relished the opportunity to manage research, seeing it as a way to extend their profiles. For instance, Pedro commented that he wanted to ‘use [the grant] to accelerate more’.

These findings raise interesting issues related to the characterization of moving from a postdoc to PI role as a significant ‘leadership transition’ (Kolb, Klappstein, and Tonner 2012). While these individuals clearly experienced the new role as a transition, and found aspects of the shift challenging and de-motivating, it was not evident that they thought of the PI role as that of a leader – perhaps because they had already demonstrated leadership responsibilities in getting the grant. Their descriptions suggest individuals focused on learning to deal with new and unexpected tasks and management responsibilities, often on their own. They brought agency and resilience to handling the new challenges and, aside from Fiona and Jerry, perceived themselves on emotionally upward journeys, in which they were learning to successful handle their new responsibilities – whether or not they enjoyed them.

**What is a PI?**

An unexpected finding emerging from the analysis was the conceptions held by these individuals of what a PI is. The reader may recall that individuals were recruited who self-defined as

- Having been awarded grant funding in their own right for the first time (not including personal fellowships);
- Supervising others; and
- Having overall responsibility for the intellectual leadership and management of the research project.
Many of the grants that individuals characterized as their first PI grant were special financial awards to support early career researchers, offered by the EU funding council, and the councils of both countries. Individuals knew about and were being directed towards these to advance their research trajectories. The names of these awards made clear they were limited to a certain period of time after PhD graduation, designed to support those who have made a commitment to research and showed potential, for example, UK NIHR Career Development Fellowship, and EPSRC Leadership Grant. Not infrequently they were called fellowships, for example, Marie Curie Fellowship. From the perspective of funding councils, the award is an investment in the future and is generally to cover salary and in some cases one support position for a number of years. Furthermore, many of these awards did not include funding to hire and supervise others. The fact that individuals considered themselves PIs even when holding fellowships rather than grants (when the funding was principally their salary) suggests two things: (a) their notion of being a PI focused on being the named researcher and having intellectual leadership for the research (and perhaps supervision) rather than the type of award and (b) the use of the term, fellowship, may be expanding given that increasingly individuals are anticipating and are expected to hold a series of fellowships each with a higher standard of research potential before they apply for grants in which they compete against all researchers regardless of experience.

A second point of interest was the institutional roles individuals held in becoming what a PI.

- Eight (Fabien, Geoff, Dan, Sam, Frances, Romeo, Mike, Cathy) were postdocs when they obtained funding and then went on to tenure-track positions: Fabien received national and institutional ECR funding which meant he could start his own group; he then moved into an associate professor role with a new national grant; Geoff was awarded a national career development fellowship and then took up a pre-tenure position in the same university; Dan was successful the second time in getting a national ECR grant and then went on to a pre-tenure post, again with a new grant; Sam, Frances, and Romeo followed similar trajectories.
- Five (Juliet, Pedro, Victor, Romeo, Laura, Fiona) obtained pre-tenure positions and then grants: Juliet, got the position before getting a standard grant, noting it was easier in her field to follow this trajectory than in other fields; Pedro, Victor, Jerry, and Fiona followed similar trajectories.
- Two (Will, Greg) obtained fellowships of some kind and were still postdocs at the time of interview.
- One (Laura) was hired on a core grant-funded position which may be particular to medicine in the UK when she was awarded a career development fellowship.

Given the prevalence of individuals getting PI grants while postdocs, it may be that the traditional mode of obtaining a pre-tenure position and then seeking a grant is becoming less common – at least in the sciences in the EU.

**Synthesis**

Overall, becoming a PI was experienced as a critical transition since it resulted in taking on new, unexpected and, to some extent, unwelcome management responsibilities which
distanced them from active research. Thus, it is unlikely they saw their new role as demonstrating leadership, something they had already been doing. Still, they took up the challenge to learn new responsibilities. A further finding is the extent to which new research funding regimes may be changing the way in which the term, PI, is understood; further exploration of this topic is warranted.

Significance

Getting funded ‘becomes partly a question of luck’ (van Arensburgen and van den Besselaar 2012, 402).

This conclusion to van Arensburgen and van den Besselaar’s study (2012) is echoed in the accounts in this study. Still, despite individuals’ beliefs that luck played a role, they invested in relatively lengthy periods of postdoctoral work in a range of institutions (often involving international mobility) to achieve their twin goals of obtaining their first grant as well as a pre-tenure position. While all had obtained the first goal, a number had not yet achieved the second.

To achieve the transition to PI, these scientists demonstrated sustained agency in developing their intellectual profile and drew on their extended networks and informal institutional resources to help them. Their continued belief in themselves demonstrated resilience and commitment as they navigated their intentions in the face of challenges including the emotionality of the journey. Given the emotional nature of academic experience is often overlooked (Nardi 2005), the results suggest future research look more closely at the role of emotion in resilience and commitment to academic work.

This study also supports the view that achieving research independence by becoming a PI is a key aspiration for early career scientists and was experienced as a significant transition. However, it called forth new, unexpected, and in many cases unwelcome, responsibilities that can be characterized as management-related – which distanced these researchers from actively researching. Still, individuals continued to navigate their intentions towards a distinct intellectual profile in the face of these new challenges.

A number of curricular imperatives are evident. Clearly, researchers need explicit opportunities, beginning during the PhD (for those aspiring to academic careers) and continuing into the postdoctoral period to learn about research funding policies, the expectations of grant proposals and the application process. Given an increasing expectation that researchers be internationally mobile, they need sensitization to the ways in which policies, proposal expectations and processes will vary across jurisdictions. Early in the first postdoc position, individuals should be well briefed on further training related to getting funded but also about the management skills they will need to be successful PIs – and be reminded from time to time. Supervisors of postdocs should be strongly encouraged to either provide this support or direct researchers to relevant institutional training.

Overall, the study highlights that the ‘learning’ period before obtaining a ‘career’ tenure-track position is extending (Schuster 2009). Yet I would argue that research education has not kept pace with these changes since it has largely been conceived as occurring at the master’s and PhD levels. Thus, the body of scholarship devoted to understanding the development of post-PhD researchers remains minimal. More research of this kind might broaden our perspective of research education to encompass the 10-year
period from the start of the PhD (EU definition). Such a re-conceptualization could lead to better support for individuals such as those in this study.

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Notes

1. A key tenet of identity-trajectory is that work is embedded in and strongly influenced by personal relationships and responsibilities. In this study, however, the focus is on work, so individual’s personal lives are not explored.
2. Note that the survey provided drop-down lists so responses were limited to the choices offered.

References


