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**Citation:**

Sinclair, J, Barnacle, R and Cuthbert, D 2013, 'How the doctorate contributes to the formation of active researchers: what the research tells us', *Studies in Higher Education*, vol. 39, no. 10, pp. 1972-1986.

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<http://dx.doi.org/10.1080/03075079.2013.806460>

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## **How the doctorate contributes to the formation of active researchers: what the research tells us**

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**Abstract:** While much research focuses on factors contributing to doctoral completion, few studies explore the role of the doctorate in forming active researchers with the skills, know-how and appetite to pursue research post-completion. This article investigates fifteen existing studies for evidence of what factors in the doctoral experience may contribute to the formation of an active researcher with a capacity for later research productivity. The analysis reveals a productive advisor may be key to forming an active researcher and, although inconclusive, productivity post-completion. Further detailed research is required, however, into how the advisor influences candidates' productivity. The article also points to other potentially influential factors requiring further investigation, such as: developing collaborative capacities, conceptualising the purpose of the doctorate as forming an active researcher, advisor mentoring and fostering emotional engagement with research.

**Keywords:** doctorate; research productivity; researcher formation; research development; research training

While much research focuses on factors contributing to doctoral completion, few studies explore the role of the doctorate in forming active researchers with the skills, know-how and appetite to pursue research post-completion. This article investigates a range of literature for evidence of what factors in the doctoral experience may contribute to the formation of an active researcher with a capacity for later research productivity. Tensions surround the role and purpose of the doctorate, and these are heightened by prevalent political pressures on doctoral education as a key driver of national innovation . On the one hand governments seek to frame doctoral study in human capital terms of training a research workforce which will drive innovation and enable national participation in the global knowledge economy (see, for example, in Australia, Department of Industry, Innovation, Science and Research, 2011a; 2011b). At the same time, older conceptions of doctoral study as 'research' persist, with doctoral graduates understood as apprentice members of disciplinary research communities (Lee and Boud 2009). In this conception the purpose of doctoral study is understood as 'preparing stewards of the discipline' (Golde and Walker 2009).

The tensions between these differing conceptions of the doctorate are compounded by the related increasing demands for accountability and efficiency. In the context of these demands aspects of the doctoral experience such as timely completion and reduced attrition rates become the focus of attention and institutional and national markers of what constitutes a 'successful' doctoral experience. Partly driving the demand for accountability and efficiency is the continued globalisation of the higher education sector over recent decades, resulting in increased competition for prospective doctoral candidates as well as for more established researchers. Universities are now ranked globally against each other, with significant weightings in the ranking process given to numbers of research outputs and citation rankings. Further, and as part of this process of globalisation, national research assessment exercises (such as, in Australia, the Excellence in Research for Australia and in the UK the forthcoming Research Excellence Framework 2014) seek to measure research outputs at institutional, departmental and individual level. This information is used to inform allocation of research funding at institutional level and also heightens expectations of the doctorate and doctoral candidature.

The complex context of doctoral study poses challenges for the multiple stakeholders in the doctorate, including advisors and candidates, as to where to focus their efforts. Although important, addressing issues such as timely completion is no longer adequate for enabling graduates to succeed in subsequent roles in this context, whether as researchers in academia or industry. Candidates whose doctoral experience is conducive to the formation of an active researcher are more likely to succeed and flourish within the competitive research economy, than those whose doctoral experience is framed in other terms. The question of what factors contribute to this formation is therefore one of importance to stakeholders with interests in the doctorate .

### **Method and scope**

As outlined above, political imperatives beyond the university in the last decade have created some urgency in addressing the question of how doctoral education forms active researchers, the focus of our interest here. However the recency of this particular question means that there is not as yet an established body of literature addressing it. Accordingly, our research involved sifting through existing studies with different foci in order to glean hints and draw inferences about what factors may facilitate the formation of active researchers. This investigation identified a number of potentially significant features which are reported on

here. Further empirical work is required to test the saliency of the factors identified as links between doctoral education and research productivity. As such, rather than a systematic and comprehensive review, what follows provides a thematic overview of potentially key aspects in the formation of active researchers.

Using keywords such as ‘doctorate’, ‘doctoral’ and ‘productivity’, and ‘doctoral experience’ our searches included key social science and educational databases, such as Academic One File, Expanded Academic, ProQuest Central, ProQuest Social Science journals and A+ Educational. Key higher education research journals were searched for articles relevant to this topic: these include *Studies in Higher Education*, *Higher Education Research and Development*, and the *International Journal for Researcher Development*. Note that we have focused primarily on literature on the research doctorate, or PhD, rather than professional doctorates, such as the Doctor of Business Administration and similar. These searches identified five studies that focus on the doctorate and research productivity during and/or post-completion (Chung and Petrick 2011; Fogarty and Ruhl 1997; Gu et al. 2011; Grove and Wu 2007; Kim and Karau 2010). Although productivity may be taken as a sign of an active researcher, productivity alone is not a sufficient indicator of whether and how research skills, know-how and an appetite for research are acquired or effected during doctoral candidature. A further ten studies considering various aspects of the doctoral experience were included in the study for insights they yield as to what other factors may facilitate the formation of an active researcher. In all fifteen studies are probed to identify potentially key aspects in the formation of an active researcher during doctoral candidacy.

A related body of work focuses on academic identity formation and development with some studies looking specifically at research identities amongst academic researchers (Archer 2008a; 2008b; Elizabeth and Grant 2013). This work demonstrates increasing recognition that researchers’ development continues into the early career phase (and potentially beyond) with associated formative and identity challenges. While the issue of identity is also relevant to our focus here, this literature has largely been excluded from this study as we sought to focus specifically on the dimensions of the doctorate that may contribute to an active researcher.

The research productivity of academics is another related body of work, in that academics’ later productivity may be the result of having been formed as an active researcher during the doctoral phase (see, for example, Fox and Milbourne 1999; Hesli and Lee 2011; Kaya and Weber 2003; see also Brew and Boud 2009, for a discussion of some of this literature and its

limitations). This extensive body of work is largely quantitative. Although some studies consider aspects of the doctorate – for example, location of doctoral study, time to completion, and discipline – as potential factors, among a typically wide range of other factors, affecting productivity, this literature does not contribute to an understanding of how the doctoral experience contributes to researcher formation and development. Given that our interest is in what factors in the doctoral experience facilitate the formation of an active researcher, much of this literature was considered beyond the scope of this investigation. What follows is a discussion of relevant work organised according to themes emerging from the studies. We use the term ‘advisor’ to refer to the person who oversees the doctoral candidate.

### **The doctorate as researcher formation?**

As outlined above, the question of what factors facilitate the formation of an active researcher is a relatively recent one. Brew, Boud and Namgung’s (2011) study is directly relevant as it investigates the role of the doctorate in the formation of academics, including its contribution to preparing graduates for a research role (other dimensions of the academic role considered include teaching and administration). They surveyed over 1000 academics at various levels up to professor, working in Australian research-intensive universities. They found no strong relationship between doctoral studies and “preparation for independent research practice” (Brew, Boud and Namgung 2011, 56). The researchers identify the following dimensions of a research role and present data on participants’ responses regarding the benefit of the doctorate to them: writing research grant applications; scholarly publishing; supervising research students; collaborating with other researchers; identifying funding opportunities; and, managing research projects. Of these, preparation for scholarly publishing ranked as the area for which respondents felt most well prepared by their doctorate (61% of respondents indicated doctoral studies prepared them ‘well’ or ‘very well’ to publish). On the remaining items, less than 50% of respondents felt ‘well’ or ‘very well’ prepared for these activities. Amongst the smaller proportion who indicated doctoral study prepared them ‘well’ or ‘very well’ for independent research practice, further investigation is required into *how* this occurred. These findings reinforce both the variability of the doctoral experience and the need for it to be more intentionally focussed on enabling candidates to become active researchers.

Post-doctoral research productivity was also considered by Brew, Boud and Namgung’s study, and they found high variability within their sample. They do not, however, correlate

relative levels of productivity to individuals' perceptions of the adequacy of doctoral training for a research role – a key interest in this review. In addressing the extent to which their sample engaged in research development activities subsequent to doctoral completion Brew, Boud and Namgung found no relation between high productivity and the amount of post-doctoral research development training (2011, 60). This also suggests that opportunities lost during the doctorate may not be easily recovered post-completion, again underscoring the importance of the doctorate in forming active researchers.

### **The doctorate and becoming an independent scholar**

The study of Brew, Boud and Namgung's (2011) indicates that doctoral graduates who go on to academic careers have differing perceptions of how well doctoral study prepared them for an independent research role. Yet we know little about what differentiates the doctoral experience of those who do (and do not) acquire a capacity to conduct research independently. A study by Gardner (2008) based on interviews with 40 doctoral candidates in two US institutions, a 'land grant' institution and a 'flagship' institution, across a range of disciplines, analysed the process of becoming an independent researcher. Gardner constructed a three-phase model of development towards independence on three dimensions: programmatic; relational and personal. The study found that students were not adequately prepared for the multiple transitions required in becoming independent researchers. This finding is consistent with that of Brew, Boud and Namgung (2011). Gardner's research points to the contradictory requirements of advisors, namely, to support candidates in their learning and to encourage independence. How this complex transition is managed by advisors and candidates may be significant to the capacity of graduates to become independent, active researchers. Gardner's findings suggest that disciplinary factors may apply. The study found that bench-science candidates' participation in peer groups in laboratories is more enabling of independence than the comparative isolation of humanities' candidates (2008, 345, see also Cuthbert and Spark 2008). Gardner posits that the transition to independence is partly effected through disciplinary socialization.

The paradoxical nature of transitioning to so-called 'independence' suggests this transition may be more accurately described in terms of the process of 'becoming peer' (Lee and Boud 2008). An emphasis on candidates' transition to independence, a notion that has been challenged elsewhere (Johnson, Green and Lee 2000), may obscure what is in fact an inter-dependent relation between advisor and candidate. rather than a transition to 'independence'.

It is possible that acquiring independence through a sense of ‘becoming peer’, may be crucial to forming an active researcher.

### **Conceptions of doctoral success**

A factor that may influence the formation of candidates as active researchers is how advisors conceptualize doctoral success and whether they understand doctoral education in these terms. Academic conceptions of doctoral success across a number of disciplines in a US ‘research extensive’ university are examined in a separate study by Gardner (2009). The study reveals that the majority of faculty consider the key factors informing doctoral success as external to the doctoral process itself. Academics in the study conceptualized doctoral success largely in terms of habits, attributes and aptitudes present in candidates before commencement of doctoral study that would enable completion. These findings raise the question, not addressed by the study, of the extent to which the incoming abilities possessed by candidates, which bear on doctoral success, may also bear on their formation as active researchers. An exception to this conceptualisation was the view of academics in English and Communication departments. Gardner found that unlike colleagues in other disciplines these academics tended to conceptualize doctoral success in terms of aptitude for research practices, that is, a candidate’s ability to produce articles for publication and present at conferences. Academics in these departments also tended to understand doctoral success in terms of successful subsequent employment rather than successful completion; thus, these departments appear to frame the doctorate in terms conducive to researcher formation and development rather than attainment of a higher degree.

Gardner refers to these capacities – presenting at conferences and seminars and writing articles – as aspects of ‘professional socialisation.’ It may be inferred from Gardner’s finding that in the absence of explicit framing or understanding of the doctorate in terms of forming an active researcher, offering candidates ‘professional socialisation’ nevertheless provides advantages for candidates in becoming active researchers. Gardner’s study usefully highlights the relevance of how advisors frame and conceptualize doctoral education to candidates’ formation as active researchers.

Relevant to academic socialisation, Gardner also finds that departments with high completion rates also had supportive, collegial cultures. Academics in oceanography, a department with one of the highest completion rates in the disciplines studied, considered factors such as candidates' happiness and passion for their topic as key indicators of success (Gardner 2009, 294, 400). A further factor was the capacity of candidates' to ask for and give help to others (Gardner 2009, 394), an indicator of a collaborative capability as is required in many science/technology fields. This finding also challenges the valorised notion of the 'independent' researcher. Active researchers may be those who learn to work collaboratively as part of a team. The relationship between the doctorate, collaborative capacities and the formation of an active researcher requires further examination.

Also suggested by this research, but not yet proven, is that 'happy' candidates, who enjoy their candidature, which includes a practical experience of functioning in a collegial environment with peers and colleagues, and are encouraged to pursue and/or find their life's passion, may be more driven to complete their doctorate. This experience may also be conducive to the formation of an active researcher. The potential association between pleasure and an active researcher is discussed in more detail below.

Brew, Boud and Namgung's study (2011) explicitly address the question of how adequately doctoral study prepares candidates to become researchers. This same question implicitly informs a study by Turner and McAlpine (2011) who look at both what doctoral candidates and 'research staff' do in their day to day work. The list of activities, derived from the logs of doctoral candidates and researchers in the social sciences, comprises research and teaching, including supervision; academic reading and writing; networking; logistics (or administration) and future employment. They describe 'striking' similarities in the nature of the work and practices undertaken by doctoral candidates and research staff (Turner and McAlpine 2011, 52). The study does not, however, explore how these practices and activities are acquired or learned, nor does it include analysis of the quantity of time allocated to each activity or the results or success of what participants describe as research activity in terms of productivity.

A relevant point noted by Turner and McAlpine (2011) relates to commitment and motivation. They found that doctoral candidates and research staff share high levels of commitment to work: and that doctoral candidates had 'a clear idea of what they wanted to do in the long term' (2011, 57). Both groups desired to make an impact and expressed emotional



reasons for undertaking research (2011, 57). This finding suggests again that emotional engagement and pleasure may be key, under-recognised, aspects in the formation of active researchers.

Taken together, the studies by Brew, Boud and Namgung (2011), Gardner (2007; 2009) and Turner and McAlpine (2011) indicate the variable nature of doctoral experience and some of the factors that may be relevant in the formation of active researchers. They point to potential misalignments between candidates, faculty and institutional expectations and conceptions of doctoral success, which may affect progress and researcher development (Pitcher 2011). Although further research is needed to confirm this, it appears that a doctoral experience conducive to the formation of an active researcher may be one where candidates, faculty and institution share common conceptions of the doctorate's purpose.

### **Publication experience and expertise**

Publication is the most visible sign of an active researcher. It is central to a research career and academic advancement. Accordingly, producing publications during doctoral candidature is increasingly expected (Aitchison, Kamler and Lee 2010; Cuthbert and Spark 2008; Raddon 2011). Some studies measure the subsequent productivity of doctoral candidates as an indicator of the quality of doctoral programmes (Roy, Roberts and Stewart 2006). Candidates completing doctorates with some publications are better placed for future employment, including research employment. What, then, does the literature tell us about the role of the doctorate in cultivating this aspect of an active researcher?

A number of studies have examined the relationship between the doctorate and research productivity by examining the number of publication 'outputs' during doctoral candidature and factors that may affect this productivity (Chung and Petrick 2011; Gu et al. 2011; Grove and Wu 2007).

In measuring productivity, Gu and others (2011) and Chung and Petrick (2011) include both the quantity and quality of publications produced by doctoral candidates' during their candidature. Gu and others examined the productivity of Chinese science doctoral graduates. They framed their study in terms of the impact of numerous variables on research productivity, comprising individual factors, advisor factors and 'learning performance' (a category not clearly defined in the study). They found that advisors are crucial to candidate productivity, in particular, the advisor's academic status, academic experience and 'quantity

of instruction' – meaning the amount of time available to spend with the candidate. Gu and others propose that candidates of productive advisors are more likely to be productive as they benefit from their advisor's research experience (2011, 498). They also found that the greater the ratio of candidates to advisor (from one to 28), the lower the research productivity of the candidate, positing that the number of candidates allocated to an advisor compromises the quantity of instruction. They suggest that academic origin (the institutional location of doctoral study) also has an effect on doctoral productivity, a point discussed below.

Although this study has limitations in terms of broader applicability, given its single discipline focus within a Chinese research institution where specific educational and cultural norms apply, it suggests some potentially fruitful lines of further enquiry. It points to the potentially key influence of the advisor on productivity during candidature and potentially to the formation of an active researcher. In light of Brew, Boud and Namgung's (2011) study, it appears that the research efficacy and productivity of a candidate's advisor may be an explanatory factor in understanding why some candidates consider their doctoral experience offered a better preparation for a research role than others.

The positive relationship between advisor productivity and candidates' productivity is confirmed by research undertaken by Chung and Petrick (2011) who hypothesise that working with leading scholars increases students' productivity. They analyse the number of articles published by doctoral candidates in hospitality and tourism in the 22 leading journals of the discipline over a five-year period. Confirming their hypothesis, they find that 'professors showing high research productivity directly and/or indirectly influenced PhD students' publications' (2011, 69). They found that candidates working with leading scholars had more publications than those who did not (2011, 69). While the majority of published candidates had only one publication, the majority of articles published by candidates were co-authored with one or two others. Of these, in over 50% of the papers, candidates were first authors, while only 8% of published articles were sole authored by doctoral candidates. This is consistent with other studies suggesting that co-publishing between advisors and doctoral candidates may contribute to academic productivity (Aitchison, Kamler and Lee 2010; Hesli and Lee 2011).

The relationship between advisor productivity, doctoral productivity and a capacity for subsequent productivity is elaborated in Williamson and Cable's (2003) study of early career research productivity. Williamson and Cable identified several predictors of early career

research productivity in a study of 152 respondents in management during the first six years of their career. They found crucially that the research productivity of a graduate signals later productivity in terms of 'skills and motivation to continue their research productivity after acquiring a job' (2003, 40). They stress the influence of advisor productivity, as do other studies, (Chung and Petrick 2011; Gu et al. 2011; Paglis, Green and Bauer 2006), positing that early career research productivity is 'enhanced by studying under advisors who are prolific researchers' (Williamson and Cable 2003, 40): 'skilled advisors ... enhance an individual's ability to acquire critical skills early in their careers, thereby increasing . . . early career performance' (2003, 40).

This group of studies appears to confirm the importance of productivity during candidature as a mark of the formation of an active researcher. They also challenge the notion of productivity as an individualised phenomenon pointing instead to productivity as a networked or inter-dependent phenomenon. It seems that active and productive departments with active and productive advisors produce candidates who have a greater likelihood of being formed as active and productive researchers.

Williamson and Cable's (2003) finding that the academic origin of the candidate is *not* as predictive of later research productivity as other factors stands in contrast to other studies that emphasise a link between academic origin and productivity. Analysing the productivity of accounting academics, Fogarty and Ruhl (1997) find that the reputation of the doctoral program and subsequent placement in a supportive research environment affects accounting faculty productivity. The link is so strong they argue 'the career paths of accounting academics begin to diverge at the time of admission to the doctoral program' (1997, 41). Studies suggesting a link between high-ranking institutions and higher productivity tend to circularity given that high-ranking institutions achieve their status partly through productivity measurements. More pertinent questions may be, in what ways do high-ranking institutions facilitate higher research activity and productivity and how do low-ranking institutions disable or truncate research activity and productivity potential?

Long (1997) speculates that the immediate social context, organisational resources and productivity rewards as well as mentoring of new faculty within established research programs (1997, 711) may be the kinds of advantages afforded to those located in a high-ranking institution. What may be tentatively suggested, in light of other studies examined in

this review, is that highly ranked institutions may have ecologies of research practice that are more hospitable and conducive to forming active researchers during doctoral candidature.

Kim and Karau's (2010) study of the research productivity of doctoral students in the field of management examined the influence of 'faculty support' for the creative work of doctoral candidature (2010, 102). They examined six factors positively associated with research productivity including the individual creative personality, support from faculty, support from family and friends, support from colleagues, research resources and workload pressures. In order to determine a measure of research productivity they asked respondents to report on the number of journal articles, conference proceedings or presentations, books and chapters in edited books published in the last six years. They found that the most important influence on research productivity was support from faculty. They frame this in terms a creative working environment and contend that encouraging creativity can translate into 'increased performance' (2010, 101). While the finding that faculty support has an influence on doctoral productivity is supported in other studies discussed, Kim and Karau's (2010) framing of the doctoral experience in 'creative' terms offers a potentially fruitful and under-examined line of enquiry.

These suggestive findings regarding the influence of advisors who are themselves productive on the publication productivity of doctoral candidates in specific disciplines such as tourism, science and management would be more robust if similar findings could be demonstrated across a broader range of disciplines. This is necessary as different practices in doctoral education apply in different disciplines (Gardner 2011; Brew and Boud 2009). Although Williamson and Cable's (2003) study of management faculty suggests a link between doctoral productivity and early career research productivity, more empirical evidence across larger cohorts and varieties of disciplines is required to establish the generalizability of this link. It is also not clear how productive advisors might contribute to their candidates' later productivity, although Chung and Petrick suggest that co-publication with an advisor may be one strategy. Other strategies suggested in the literature include offering direct instruction in writing and editing; giving feedback on drafted material, and; encouraging candidates to treat writing as a way of thinking and being (Martin 2009).

Hemmings (2012) suggests that practical, sustained writing practice in doctoral education is central to the self-efficacy of early career researchers, a finding that confirms the importance

of writing confidence to publication output (Hemmings, Smith and Rushbrook 2004; Cuthbert and Spark 2008) and, possibly, to the formation of an active researcher.

### **Influence of advisor and/or mentor during candidature**

The studies considered above examining doctoral productivity indicate the influence of the advisor on productivity. Further evidence of the interlocking nature of the advisory relationship and productivity, both during and subsequent to doctoral candidature, and its relevance to the formation of an active researcher emerges in a number of studies considering this relationship more directly.

Paglis, Green and Bauer's (2006) and Green and Bauer's (1995) studies consider the influence of mentoring on the publication productivity of candidates in the hard sciences at year 2 and 5 since commencing doctoral candidature in a U.S. Class 1 research university. Unlike Williamson and Cable's (2003) study of the productivity of management faculty, where all advisor-candidate relationships were framed as mentor relationships, these studies treat mentoring as a particular mode of supervision. In other words, not all advisors act as mentors to all their candidates. As Paglis, Green and Bauer (2006) note, mentoring is parallel to, but not synonymous with, the advisory role. Measured at year two of doctoral study, they found no positive relation between mentoring and the research productivity of candidates (Green and Bauer 1995). However, an unexpected finding of the study is that the amount of mentoring candidates' received could be predicted by students' incoming potential, measured by attitudes, objective abilities and prior research-related experience. Commenting on this earlier study, Paglis, Green and Bauer (2006) suggest advisers target the best qualified candidates to mentor or that the best qualified students seek out a mentoring relationship (2006, 454). This finding is relevant in view of their finding that the mentor relationship has a positive effect on later productivity. It suggests that subsequently productive researchers may bring to their candidature some of the attitudes, abilities and experiences that will contribute to their becoming formed as active researchers, including an ability to secure mentoring time, and that particular advisors recognise such abilities and select candidates on that basis. This would suggest the successful formation of an active researcher may be in part determined by the attitudes and abilities candidates bring to candidature, and by their framing and expectations of the doctoral experience, as also suggested in Gardner's (2009) study of faculty conceptions of doctoral success.

In their later study, Paglis, Green and Bauer (2006) measured three dimensions of mentoring – collaboration on research publication, psychosocial mentoring and career commitment – and their effects on doctoral candidates five and half years after commencement. The dimensions of ‘research collaboration’ – translated by the authors into a measure of research self-efficacy – include mentoring in the skills required to become an active researcher, such as submitting a paper to a journal that will be accepted, co-authoring, conducting a research project and so on (2006, 465). Psychosocial mentoring includes empathy, encouragement, responsiveness to questions regarding competence, commitment, role modelling, sharing professional experiences and so on (2006, 465). The list of dimensions is comprehensive but can be summed up as ‘someone who cares’ (Zellers, Howard, Barcic, 2008). Interestingly, psychosocial and research collaboration mentoring were found to influence research productivity five and half years from commencement of doctoral candidature. This study suggests that the particular nature of supervision received can directly affect whether a candidate is formed as an active researcher during candidature and points to longer term effects of such supervision. The importance of a mentor in establishing a research career has also been identified in studies examining the postdoctoral experience (Scaffidi and Berman 2011). Other studies, however, have suggested that supervision as mentoring can be a contradictory and ambivalent practice (Manathunga 2007) and that personal support in advisory practice does not necessarily translate to research efficacy (Overall, Deane and Peterson 2011).

There was no measurable impact of mentoring on career commitment. The authors suggest this may represent ‘an overwhelming self-selection effect’ (Paglis Green and Bauer 2006, 471). In other words, candidates with abilities are perhaps already committed to an academic career in a research university; they are then selected by or seek out mentors who support and confirm a predisposition to becoming an active researcher but the mentoring has little reinforcement effect as candidates are already predisposed to a research career. Studies of undergraduate programs offering research opportunities have been also shown not to increase interest in research roles as participants also tend to have a pre-existing interest or commitment to a research role and increased research confidence (John and Creighton 2001; Cuthbert, Arunachalam and Licina 2012). As indicated earlier, this work also suggests that pre-existing aptitudes, orientations and capacities including a predisposition to becoming an active researcher may be key to forming an active researcher during candidature.

In a study of doctoral students' socialisation to academic norms, Weidman and Stein (2003) nominate three categories of 'socialisation': participation in scholarly activities; student-faculty and student-peer interactions, and; supportive faculty environment. Their definition of 'socialisation' and the list of 'scholarly activities' that candidates may be socialised into includes: writing grant proposals; authoring papers for publications, and; giving and receiving critical feedback (2003, 647). This range of activities extends beyond the completion of a thesis and confirms other studies emphasising the importance of enculturation and reproduction of knowledge (Delamont, Atkinson and Parry 1997; Delamont, Parry and Atkinson 1997). Weidman and Stein's (2003) study suggests that candidates who are effectively socialised into scholarly practices may be advantaged in their development as active researchers, even in the absence of explicit framing of the doctorate in these terms, compared with those who are not, as noted above. While typically, access to research cultures may not necessarily be equal (Deem and Brehony 2000), in terms of forming active researchers, 'socialisation' appears not to be peripheral, additional or an optional extra to doctoral education but instead appears to be central.

In a study of how researchers learn to do research Raddon (2011) emphasises the importance of informal learning during, and subsequent to, doctoral candidature. Raddon (2011) analysed narratives of 30 'researchers/academics' in the UK at various professional levels ranging from early career and doctoral candidates to retiring or retired academics. Across the generations, the findings are mixed regarding the ways research was learnt: some respondents reported being left on their own with no support during doctoral candidature (2011, 35), while others emphasised the positive advisory relationship in learning research practices, in particular, learning to write both a doctoral thesis and academic articles. Raddon (2011) notes that younger generations of mid and early-career researchers experienced more formal learning as part of their PhD post the mid-1990s. Raddon finds that study participants did not regard their PhD as the end of their researcher development process. Many stress the importance of on-going informal learning and 'learning through projects' (2011, 38). Emphasis on informal learning again suggests participation in research cultures may be central to forming an active researcher and suggest there may be a need to formalise research knowledge to enable more candidates access to it.

These studies suggest that in addition to the role of the advisor in encouraging publication expertise and productivity, the advisor's attention to mentoring and socialisation of a candidate may also be crucial to the formation of an active researcher.

## **Emotional engagement with research**

As outlined above, 'productivity' in the form of publications is a key marker of an active researcher. Typically literature analysing academic productivity examine external factors as potential determinants of productivity. Hesli and Lee's (2011) study of productivity among US political scientists, for example, drew on 32 prior studies to identify 22 variables affecting productivity (Hesli and Lee 2011), including the ranking of the PhD program, years to doctoral completion and dissertation sub-field.

Studies by Gardner (2009) and Turner and McAlpine (2011), however, hint at another possible key to the formation of an active researcher that is; the excitement, pleasure and sense of emotional engagement and creativity that some associate with research. There are hints and references to the pleasures of and emotional engagement with research elsewhere in a range of studies concerning research and researchers including Akerlind's (2008) study of the ways researchers relate to research; studies of doctoral candidacy that refer to the 'pleasures of doctoral work' (McAlpine 2012); the 'passion' of doctoral candidates and early career researchers for their work and the thrill of producing new ideas (Bowden et al 2005; Hakala 2009; McAlpine 2010; McAlpine and Amundsen 2009; Turner and McAlpine 2011) the 'joy', 'delight' and 'satisfaction' of doctoral candidature, and even the intense happiness of doctoral research as a life-transforming experience (Mowbray and Halse 2010). It has been argued that passion for their field is the prime motivation of doctoral candidates to undertake research (Walker et al. 2008, 121).

Productivity discourse appears aligned with attempts to rationalise and routinize higher degrees by research (Connell and Manathunga 2012), emphasising the discipline required for productivity, rather than the pleasure in the work (Sinclair 2006; Barnacle and Dall'Alba, forthcoming). It may be that engagement with research work is a crucial aspect of the formation of an active researcher and that a creative, engaging doctoral experience may be conducive to the formation of an active researcher. The link between creative, enthusiastic engagement with research work and productivity has not been investigated in the vast productivity literature, as the majority of work focuses on external or extrinsic factors rather than intrinsic or internal motivators. Developing these ideas further - particularly in relation to the role of the doctorate in cultivating emotional engagement with research work as a key to formation of an active researcher - offers a fruitful path for future research.

## **Conclusion**



This paper offers an analysis of themes emerging from literature relevant to the question of the role of the doctorate in forming active researchers and a capacity for later research productivity. This analysis of existing research points to a need for more focussed research on this question, in particular research that examines in more detail the key points emerging from the investigation. The strongest finding from the literature reviewed here concerns the role of a productive advisor in contributing to productivity during doctoral candidature which appear to be correlated to a capacity for later research activity. However, more fine-grained analysis of how a productive advisor influences a candidate's productivity is not yet available and would also be a valuable focus for future work, particularly concerning the writing and publication practices between advisor and candidate. The indicators here are that an active and productive advisor is conducive to forming an active and productive researcher, a capacity that may also be enhanced by an active research culture and department.

The literature has also disclosed some other potential factors relevant to the role of the doctorate in forming an active researcher with a capacity for later productivity requiring further investigation. These include whether candidates' sense of 'becoming peer' is more significant to establishing a sense of research efficacy than becoming an 'independent researcher'; how well collaborative capacities are developed in doctoral study; how and whether candidates, advisors and institutions conceptualize success in term of the formation of an active researcher; how candidates are socialised into research practice; and the role of emotional engagement in forming research dispositions.

As outlined in the introduction, there are tensions surrounding the role and purpose of the doctorate. However the conditions that produce an interest in the question of what kind of doctoral experience is conducive to the formation of an active researcher appear likely to continue into the foreseeable future. Despite some resistance amongst established academics to increased emphasis on the research role, it seems that enabling current and future doctoral candidates to become formed as active researchers is a productive approach to the doctoral endeavour, with a capacity to satisfy sometimes competing stakeholders. Candidates formed as active researchers are likely to have more employment opportunities within academia and elsewhere. Moreover, the indications from the literature investigated here suggest that doctoral experiences conducive to forming active researchers may not be so far removed from practices that also produce able academics.

This study has begun the work of identifying what kinds of doctoral experiences are conducive to forming active researchers but points to the need for more focussed inquiry so that we might gain a fuller understanding of this formative experience. More focussed study would test the tentative indicators drawn from this review of and potentially identify other salient factors not yet apparent.

## Bibliography

- Aitchison, Claire, Barbara Kamler, and Alison Lee. 2010. *Publishing pedagogies for the doctorate and beyond*. Oxford: Routledge.
- Akerlind, Gerlese. 2008. An academic perspective on research and being a researcher: an integration of the literature. *Studies in Higher Education* 33, no. 1: 17–31.
- Archer, Louise. 2008a. The new neo-liberal subjects? Young/er academics constructions of professional identity. *Journal of Education Policy* 23, no. 3: 265 –85.
- Archer, Louise. 2008b. Younger academics’ constructions of ‘authenticity’, ‘success’ and professional identity. *Studies in Higher Education* 33, no. 4: 38 – 403.
- Australian Research Council. 2012. Excellence in Research for Australia . <http://www.arc.gov.au/era/>
- Bowden, John A., Pam Green, Robyn Barnacle, Nita Cherry, and Robin Usher. 2005. Academics’ ways of understanding success in research activities. In *Doing Developmental Phenomenography*, ed. John A. Bowden and Pam Green, 128–44. Melbourne: RMIT University Press.
- Barnacle, Robyn, and Gloria Dall’Alba. 2013. Beyond skills: embodying writerly practices through the doctorate.
- Brew, Angela, and David Boud. 2009. Understanding academics’ engagement with research. In *Academic Research and Researchers: Policy and Practice*, ed. Angela Brew and Lisa Lucas, 189– 203. Maidenhead: Open University Press.
- Brew, Angela, David Boud, and Sang Un Namgung. 2011. Influences on the formation of academics: the role of the doctorate and structured development opportunities. *Studies in Continuing Education* 33, no. 1: 51–66.
- Boud, David, and Alison Lee. 2005. ‘Peer learning’ as pedagogic discourse for research education. *Studies in Higher Education* 30, no. 5: 501–16.
- Chung, Jin Young, and James Petrick. 2011. Doctoral students’ research productivity: An analysis of publications in tourism and hospitality journals. *Journal of Hospitality, Leisure, Sport & Tourism Education* 10, no.1: 63–71.
- Connell, Raewyn, and Catherine Manathunga. 2012. On doctoral education: How to Supervise a PhD 1985–2011. *Australian Universities Review* 54, no. 1: 5–9.
- Cuthbert, Denise, Dharma Arunachalam, and Dunja Licina. 2012. ‘It feels more important than other classes I have done’: an ‘authentic’ undergraduate research experience in sociology. *Studies in Higher Education* 37, no. 2: 129–42.
- Cuthbert, Denise, and Ceridwen Spark. 2008. Getting a GRiP: Examining the outcomes of a

pilot program to support graduate research students in writing for publication. *Studies in Higher Education* 33, no.1: 77–88.

Department of Innovation, Industry, Science and Research. 2011a. *Research skills for an innovative future: A research workforce strategy to cover the decade to 2020 and beyond*. Canberra: Department of Innovation, Industry, Science and Research <http://www.innovation.gov.au/Research/ResearchWorkforceIssues/Documents/ResearchSkillsforanInnovativeFuture.pdf>

Department of Innovation, Industry, Science and Research. 2011b. *Maximising the innovation dividend: Review, key findings and future directions*. Canberra: Department of Innovation, Industry, Science and Research <http://www.innovation.gov.au/Research/Documents/ReviewAdvicePaper.pdf>

Deem, Rosemary, and Kevin Brehony. 2000. Doctoral students access to research cultures – are some more equal than others? *Studies in Higher Education* 25, no. 2: 149–65.

Delamont, Sara, Paul Atkinson, and Odette Parry. 1997. Critical mass and doctoral research: Reflections on the Harris Report. *Studies in Higher Education* 22, no. 3: 319–31.

Delamont, Sara, Odette Parry, and Paul Atkinson. 1997. Critical mass and pedagogic continuity: Studies in academic habitus. *British Journal of Sociology of Education* 18, no.4: 533–49.

Dwyer, Angela, Bridget Lewis, Fiona McDonald, and Marcelle Burns. 2012. ‘It’s always a Pleasure’: Exploring productivity and pleasure in a writing group for early career academics. *Studies in Continuing Education* iFirst, 1–12.

Elizabeth, Vivienne and Barbara M. Grant. 2013. ‘The spirit of research has changed’: reverberations from researcher identities in managerial times. *Higher Education Research and Development* 32, no.1: 122-135.

Fogarty, Timothy J., and Jack M. Ruhl. 1997. Institutional antecedents of accounting faculty research productivity: A LISREL study of the ‘best and brightest’. *Issues in Accounting Education* 12, no. 1: 27–48.

Fox, K. J., and R. Milbourne. 1999. What determines research outputs of academic economists? *Economic Record* 75, no. 230: 256–67.

Gardner, Susan K. 2009. Conceptualizing success in doctoral education: Perspectives of faculty in seven disciplines. *The Review of Higher Education* 32, no. 3: 383–406.

Gardner, Susan K. 2008. ‘What’s too much and what’s too little?’ The process of becoming an independent researcher. *The Journal of Higher Education* 79, no. 3: 326–50.

- Green, Stephen G., and Talya N. Bauer. 1995. Supervisory mentoring by advisers: Relationships with doctoral student potential, productivity, and commitment. *Personnel Psychology* 48, no. 3: 537–61.
- Grove, Wayne A., and Stephen Wu. 2007. The search for economic talent: Doctoral completion and research productivity. *The American Economic Review* 97, no. 2: 506–11.
- Gu, Jibao, Yu Lin, Doug Vogel, and Wen Tian. 2011. What are the major impact factors on research performance of young doctorate holders in science in China: a USTC survey. *Higher Education* 62: 483–502.
- Hesli, Vicki. L., and Jae Mook Lee. 2011. Faculty research productivity: Why do some of our colleagues publish more than others? *PS: Political Science and Politics* 44: 393–408.
- Hakala, Johanna. 2009. The future of the academic calling? Junior researchers in the entrepreneurial university. *Higher Education* 57, no.2: 173–90.
- Hemmings, Brian. 2012. Sources of research confidence for early career academics: A qualitative study. *Higher Education Research and Development* 31, no. 2: 171 –84.
- Hemmings, Brian, Erica Smith, and Peter Rushbrook. 2006. Factors differentiating between those academics who do and who do not publish refereed works. *Issues in Educational Research* 14, no. 2: 155–66.
- Joanna, John, and John Creighton. 2011. Researcher development: The impact of undergraduate research opportunity programmes on students in the UK. *Studies in Higher Education* 36, no. 7: 781–97.
- Lesley Johnson, Alison Lee, and Bill Green. 2000. The PhD and the autonomous self: Gender, rationality and postgraduate pedagogy. *Studies in Higher Education* 25, no. 2: 135–47.
- Kim, Kiwan, and Steven J. Karau. 2010. Working environment and the research productivity of doctoral students in management. *Journal of Education for Business* 85: 101–6.
- Kaya, Naz, and Margaret J. Weber. 2003. Faculty research productivity: Gender and discipline differences. *Journal of Family and Consumer Sciences* 95, no. 4: 46–52.
- Lee, Alison, and David Boud. 2008. Framing doctoral education as practice. In *Changing practices of Doctoral Education*, ed. David Boud and Alison Lee, 10–25. Hoboken: Routledge.
- Long, Rebecca. G., William P. Bowers, Tim Barnett, and Michael C. White. 1998. Research productivity of graduates in management: Effects of academic origin and academic

- affiliation. *Academy of Management* 41, no. 6: 704–14.
- Manathunga, Catherine. 2007. Supervision as mentoring: the role of power and boundary crossing. *Studies in Continuing Education* 29, no. 2: 207–21.
- McAlpine, Lynn. 2012. Identity-trajectories: Doctoral journeys from past to present to future. *Australian Universities Review* 54, no. 1: 38–47.
- McAlpine, Lynn, and Cheryl Amundsen. 2009. Identity and agency: Pleasures and collegiality among the challenges of the doctoral journey. *Studies in Continuing Education* 31, no. 2: 109–25.
- Martin, Brian. 2009. Research productivity: Some paths less travelled. *Australian Universities Review* 51, no.1: 15–20.
- Mowbray, Susan, and Christine Halse. 2010. The purpose of the PhD: Theorising the skills acquired by students. *Higher Education Research & Development* 29, no. 6: 653–64.
- Overall, Nickola C., Kelsey L Deane, and Elizabeth R. Peterson. 2011. Promoting doctoral students' research self-efficacy: Combining academic guidance with autonomy support. *Higher Education Research & Development* 30, no. 6: 791–805.
- Pitcher, R. 2010. The self in research and other matters: A study of doctoral students' conceptions. *International Journal of Researcher Development* 1, no. 3: 59–68.
- Paglis, Laura L., Stephen G. Green, and Talya N. Bauer. 2006. Does adviser mentoring add value? A longitudinal study of mentoring and doctoral student outcomes. *Research in Higher Education* 47, no. 4: 451–76.
- Raddon, Arwen E. 2011. A changing environment: Narratives of learning about research. *International Journal for Researcher Development* 2, no. 1: 26–45.
- Research Excellence Framework. 2014. <http://www.ref.ac.uk/>
- Roy, Kimberlee, Michael C. Roberts, and Peter K. Stewart. 2006. Research productivity and academic lineage in Clinical Psychology: Who is training the faculty to do research? *Journal of Clinical Psychology* 62, no. 7: 893–905.
- Scaffidi, Amelia, and Judith Berman. 2011. A positive postdoctoral experience is related to quality supervision and career mentoring, collaborations, networking and nurturing research environment. *Higher Education*, 62: 685–98.
- Sinclair, Jennifer. 2009. Discipline and pleasure. In *Beyond Doctorates Downunder: Maximising the impact of your doctorate from Australia and New Zealand* ed. Carey Denholm and Terry Evans, 106–12. Melbourne: ACER Press.

- Turner, Gill, and Lynne McAlpine. 2011. Doctoral experience as researcher preparation: Activities, passion, status. *International Journal for Researcher Development* 2, no. 1: 46–60.
- Walker, George E., Chris M. Golde, Laura Jones, Andrea Conklin Bueschel, and Pat Hutchings. 2008. *The formation of scholars: Re-thinking doctoral education for the twenty-first century*. Stanford: The Carnegie Foundation for the Advancement of Teaching.
- Weidman, John C., and Elizabeth L. Stein. 2003. Socialization of doctoral students to academic norms. *Research in Higher Education* 44, no. 6: 641–56.
- Williamson, Ian O., and Daniel M. Cable. 2003. Predicting early career research productivity: The case of management faculty, *Journal of Organizational Behaviour*, 24: no. 1: 25–44.
- Zellers, Darlene F., Valerie M. Howard, Maureen A. Barcic. 2008. Faculty mentoring programs: Reenvisioning rather than reinventing the wheel. *Review of Education Research* 78, no. 3: 552–88.