Researcher Identity Development

THE CROSS-COUNTRY POST-PHD RESEARCHER EXPERIENCE SURVEY (C-PDR)

User's Manual

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Acknowledgements

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1. Introduction

1.1.   General description

The Post-PhD Researcher[1] survey is a multidimensional self-report instrument designed to measure post-PhD researchers experience across countries and disciplines. The C-PDR focuses on measuring the main determinants of the work of early career researchers repeatedly identified in the literature on ECR experience (Akerlind 2005; van der Weijden et al. 2016). It is based on a program of quantitative and qualitative research that examined post-PhD researchers' experience.

The C-PDR assesses six core elements of post-PhD experience. There are five main sections to the C-PDR, measuring motivation, supervisory and researcher community support, research writing perceptions, and experienced well-being. The C-PDR concerns following scales: (1) interest in research work; (2) supervisory and researcher community support; (3) research engagement; (4) burnout, and (5) research writing. The scales present key determinants of post-PhD experience identified frequently in the research literature of the area. Each section can be also used separately to measure a specific element of post-PhD experience.

The Post-PhD Researcher survey is adapted from The Cross-Country Doctoral Experience survey originally developed and used for exploring doctoral experience among Finnish PhD students (e.g. Pyhältö, Stubb & Lonka, 2009; Pyhältö, Vekkaila & Keskinen, 2015; Sakurai, Vekkaila & Pyhältö, 2017; Löfström & Pyhältö, 2016). The first version of cross-cultural C-PDR was piloted in FINS project (2014-2016). The present versions of C-PDR has been further developed and validated in across seven European countries. There are Finnish, Spanish, Catalan, English and French-language versions of the scales available. The scales reported in the manual are based on the cross-country data sets. The theoretical basis for each scale is reported in listing of each subscale.

1.2.   Development of C-PDR

Scale and item development of the C-PDR was based on ECR student reports gained in qualitative, exploratory studies on Post-PhD researchers' experiences across the disciplines and countries (e.g.

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[1] We use the term, post-PhD researcher, to refer to both those who are on contract and those on fellowship, while recognizing that their experiences are somewhat different.

Vekkaila, Virtanen, Taina & Pyhältö, 2018; McAlpine & Austin 2018; Mitra & McAlpine 2017; McAlpine et al. 2017; Castelló, Iñesta & Corcelles, 2013; Castelló & Donahue, 2012; Castelló & Mateos, 2015). Concerning burnout, item construction was based on Maslach and Jackson's burnout inventory (1981). Research engagement scale draws on both on the set of qualitative studies on engagement and study engagement inventory (Vekkaila, Pyhältö & Lonka, 2013a; 2013b; 2014; Schaufeli, Bakker, & Salanova, 2006; Salmela-Aro, 2009). From an initial item pool, items were selected for preliminary versions of the scales by using expert judgment and criteria of redundancy. Selection of items for the final version was based on item statistics of the preliminary versions and on results of confirmatory factor analysis (see Pyhältö, Vekkaila & Stubb, 2015, for the supervisory and researcher community support; Pyhältö, Peltonen, McAlpine & Castello, 2019, for the interest in doctoral studies scale; Lonka, Chow, Keskinen, Hakkarinen, Sandstorm & Pyhältö 2016; Castello, Pyhältö & McAlpine, 2017 for research writing scale and Corner, Löfström & Pyhältö, 2017 for burnout scale).

The final C-PDR scales were discussed in cross-cultural teams. Researchers from each country discussed all the items in English and adapted them into Spanish and English using forward-backward translation procedure. After this, pilot studies were conducted in each country using the versions in English, Spanish and Finnish to confirm the appropriateness of the wording both linguistically and culturally – and the overall structure of the questionnaire. The English, Spanish and Finnish C-PDR scales were administered to a sample of $N = 282$ Post-PhD researchers from Spain and UK (53.0 % females, 47.0 % males; mean age 35.9 years). Item and scale characteristics reported in section 2 are based on this sample.

1.3. Item and Scale Characteristics

The scales of the C-PDR are detailed in section 2 of this manual. The section includes all items of the C-PDR, ordered by scale. Descriptive item statistics (means, standard deviations, part-whole corrected item-total correlations) and scale statistics (means, standard deviations, reliabilities) are reported as well. These statistics indicate that there is sufficient item score variation, and that item-total correlations are robust. Also, there is sufficient variation of scale scores for each scale. The reliabilities of the C-PDR scales range from adequate to very good (Alpha = .61 to .98 with, with an average Alpha of .81 and Alpha > .80 for 9 (40.0 %) of the 15 scales and subscales).

Scale correlations are shown in the Appendix 1. Most of these correlations are low to medium, thus indicating discriminant validity. Higher correlations were found for neighboring constructs (e.g. blocks and procrastination). The internal structural validity of the C-PDR scales in terms of scale component structures has been analyzed by means of exploratory and confirmatory factor analysis.

It takes approximately 15-30 minutes to complete and can be given both in paper and in online. PhD students rate their experiences on a seven-point Likert scale from "strongly disagree" (1) to "fully agree" (7).

2. Listing of Subscales

2.1.   Interest in research work

Interest in research work is reflected in post-PhD researcher affect associated with post PhD research and personal significance given to it (Pyhältö, Peltonen, Castello & McALpine, 2019). Accordingly, interest comprises both feeling- and value-related valences (See Hidi & Renninger, 2006; Krapp, 2002; 2005) such as involvement or stimulation, whereas value-related valence refers to the attribution of personal significance or importance of one's work. Interest is not an individual trait, but can vary, depending on the object of activity and the post-PhD researcher-working environment dynamics. Interest in scale comprises of three sub-scales, in total 16 items) *research interest*, curiosity to explore and create new knowledge; b) *professional interest*, opportunity to cultivate one's professional skills and knowledge, and c) *instrumental interest*, using doctoral degree and other research merits as a mean to an end, such as getting better salaries or promotion once the degree is earned.

Table 1. Items included in the interest scale (Cronbach,s alpha, Mean, Standard Deviation, and Item-total correlation

Instruction: *Evaluate the following statements about your interest in post-doctoral research. I'm doing post-doctoral research because... 1(=strongly disagree) ... 7(=fully agree)*

	Alpha	M	SD	ITr
Research interest (REI)	.93	5.90	1.11	-
REI1 I enjoy intellectual challenges.		6.24	1.13	.76
REI2 Finding out new things is fascinating.		6.17	1.32	.81
REI3 I want to contribute to my field of research.		5.99	1.35	.81
REI4 I am inspired by my research topic.		5.61	1.41	.68
REI5 I am inspired by the work as researcher.		5.67	1.45	.74
REI6 I want to develop my skills.		6.14	1.30	.80
REI7 I want to work in a research community.		5.93	1.39	.71
REI8 My research is useful for others.		5.57	1.56	.69
REI9 I want to develop myself.		5.96	1.51	.70
REI10 I want to complete what I started.		5.69	1.63	.66
Professional interest (PEI)	.77	5.31	1.60	
PEI1 I want to get a better salary.		5.44	1.81	.69
PEI2 I want to get a better position.		5.66	1.68	.63
PEI3 I want to have a doctoral degree.		4.84	2.26	.54
Instrumental interest (INI)	.74	4.28	1.45	
INI1 Degree is required in my future work.		4.84	2.15	.64
INI2 My job prospects are better after doctoral degree.		4.57	2.05	.52
INI3 After having my PhD, I got a post-doc position at a university		5.08	2.12	.53

Here and in similar tables we present the variables of the subscales ordered based on the results of the factor analysis so that the variable with the highest absolute value of loading is first. We recommend that all subscale scores be calculated as arithmetic means of the variables included in the scale. E.g. Interest in Research Work Scale score = (REI1+REI2+..)/10.

2.2.   Supervisory and researcher community support

Social support (see also seminal work on social support by Cobb, 1975) itself refers to the resources both perceived to be available and used by the post-PhD researchers in their social environment. These comprise of both formal and informal relationships, including dyadic and group relationships

within the researcher communities, with peers, i.e. Post-doctoral researchers and post-PhD researchers, supervisor(s), other senior researchers and staff members (Vekkaila, Virtanen, Taina & Pyhältö 2016) as well as research groups, international researcher networks or special interest groups, and relationships with institutional representatives, for example funding agencies (Pyhältö, McAlpine, Peltonen & Castello 2017). They provide the primary sources of support for their work as researchers. High quality social support, particularly from the supervisor and the researcher community has been identified as one of the main determinants for successful post PhD (Pyhältö, McAlpine, Peltonen & Castello, 2017; Vekkaila, Virtanen, Taina & Pyhältö, 2018). The survey measures two complementary *forms of support*, including *emotional*, and *informational* forms of support in supervisory relationship and in researcher community interaction (Pyhältö, 2018). Emotional support consists of empathy, trust, listening, caring and belonging to a network of researcher communities with mutual obligation, whereas informational support is characterized by information, such as advice, feedback, affirmation, suggestions, and problem solving that enable an early career researcher to cope with problems. Supervisory and researcher community -scale comprises of two sub-scales, in total 11 items:

a) *Research community support*: entailing emotional and informational support received from the other members of the researcher community.

b) *Supervisory support*: comprising of emotional and informational support received from the supervisor(s).

Table 2. Items included in the supervision and researcher community scale (Cronbach's alpha, Mean, Standard Deviation, and Item-total correlation

Instruction: *Rate the following statements about your researcher community and supervision 1(=strongly disagree) ... 7(=fully agree).*

	Alpha	M	SD	ITr
Researcher community support (RCS)	.90	5.01	1.25	_
RCS1 I feel that the other members of my research community appreciate my work.		5.02	1.52	.81
RCS2 I feel accepted by my research community.		5.11	1.39	.77
RCS3 I receive encouragement and support from the other researchers.		5.17	1.59	.68
RCS4 My expertise is put use in the research community.		4.93	1.50	.69
RCS5 I feel that I am treated with respect.		4.98	1.72	.78
RCS6 There is a good sense of collegiality among the researchers I interact with.		5.30	1.63	.66
RCS7 I often receive constructive criticism.		4.58	1.72	.59
Supervisory support (SS)	.95	5.07	1.81	_
SS1 I feel that my supervisor(s) appreciate my work.		5.17	1.93	.92
SS2 I feel appreciated by my supervisor(s).		5.24	1.90	.92
SS3 I receive encouragement and personal attention from my supervisor(s).		4.88	2.00	.90
SS4 I can openly discuss any problems related to my post-doc research with my supervisor(s).		5.01	1.92	.81

This section also includes a single item measuring satisfaction with supervision with a 1-7 scale. It can be used to assess post-PhD researcher's general experience on supervision.

Satisfaction with your supervision	
	1 (=unsatisfied)… 7 (=completely satisfied)
Are you satisfied with your supervision	1 2 3 4 5 6 7

Here and also with the following scales we recommend that all subscale scores be calculated as arithmetic means of the variables included in the scale. E.g. Researcher Community Scale Score =

(RCS1+RCS2+..+RCS7)/7. The singe item measuring satisfaction with the supervision should be used as a single item indicating the overall satisfaction with supervision.

2.3. Engagement in post-PhD research

Engagement is characterized by a combination of study-related vigour, dedication and absorption (Salmela-Aro & Upadaya, 2012; Schaufeli et al., 2002; Salanova, Llorens, & Schaufeli, 2011). Vigour refers to high levels energy, mental resilience, persistence and willingness to invest effort to one's work while carrying out research; dedication describes the sense of significance, inspiration and involvement achieved through research; and absorption characterizes full concentration and engrossment, or the state of being happily and singularly focused on research. This section of the survey includes 9 items measuring research engagement (Pyhältö, McAlpine, Peltonen & Castello, 2017). The scale draws on study engagement inventory Salmela-Aro et al., 2012 and series of qualitative studies on Post-PhD researchers' engagement (Vekkaila et la, 2012; 2013; 2014).

Table 3. Items included in the research engagement scale (Cronbachs alpha, Mean, Standard Deviation, and Item-total correlation

Instruction: *Rate the following statements about your engagement in your post-doctoral research. 1(=strongly disagree) ... 7(=fully agree).*

	Alpha	M	SD	ITr
Engagement (EG)	.95	5.34	1.26	
EG1 I feel happy when I start working on my research.		5.44	1.51	.85
EG2 I am enthusiastic about my research.		5.67	1.44	.85
EG3 My research inspires me.		5.45	1.48	.84
EG4 When doing my research, I feel vigorous.		5.27	1.42	.83
EG5 When I conduct research, I feel that I am bursting with energy.		5.32	1.42	.80
EG6 I am immersed in my research.		5.13	1.50	.79
EG7 I find the research that I do full of meaning.		5.50	1.46	.77
EG8 Time flies when I'm doing my research.		5.59	1.45	.79
EG9 When I am doing my research, I forget everything else around me.		4.74	1.70	.70

We recommend calculating the subscale score as arithmetic mean of the variables included in the scale.

2.4.   Burnout

Burnout results from prolonged exposure to overly extensive work related stress (Freudenberger, 1974). It has two distinctive symptoms: exhaustion and cynicism (Bakker, Schaufeli, Leiter, & Taris, 2008; Maslach & Leiter, 2005; 2008). Exhaustion is characterized by a lack of emotional energy and feeling strained and tired at research work, whereas cynicism is characterized by losing interest in one's work and feeling that one's research has lost its meaning; distancing oneself from the doctoral studies often results in reduced involvement. This section of the survey contains two sub-scales measuring, in total 10 items (Pyhältö, McAlpine, Peltonen & Castello, 2017).

a) *Exhaustion* resulted from post-doctoral work,
b) *Cynicism* towards post-doctoral work,

Table 4. Items included in the burnout scale (Cronbach's alpha, Mean, Standard Deviation, and Item-total correlation

Instruction: *Rate the following statements about your experience of post-doctoral work. 1(=strongly disagree) ... 7(=fully agree).*

	Alpha	M	SD	ITr
Exhaustion (EX)	.77	3.54	1.42	
EX1 The pressure of my post-doc work causes me problems in my close relationships with others.		2.82	1.85	.66
EX2 I often sleep badly because of matters related to my post-doc work.		3.04	1.92	.62
EX3 I brood over matters related to post-doc work a lot during my free time.		3.98	1.90	.51
EX4 I feel overwhelmed by the workload of my post-doc work.		4.32	1.72	.49
Cynicism (CY)	.89	2.96	1.53	
CY1 I have difficulties in finding any meaning to my post-doc work.		2.58	1.79	.78
CY2 I feel that I am losing interest in my post-doc work.		2.92	1.95	.79
CY3 I used to have higher expectations of my post-doc work than I do now.		3.58	2.09	.71
CY4 I feel burned out.		3.26	2.08	.68
CY5 I feel my post-doc work is useless.		2.60	1.65	.64
CY6 I often feel that I fail in my research		2.78	1.83	.63

In addition, the single item stress -scale measuring feelings of stress was utilized to measure stress-levels of Post-PhD researchers (Elo, Leppänen & Jahkola, 2003)

Stress means feeling nervous, uneasy dis-stressed or having difficulties sleeping because of things that are bothering you.	1(=not at all)... 7(=very often)
Do you have such feelings?	1 2 3 4 5 6 7

We recommend that all subscale scores be calculated as arithmetic means of the variables included in the scale.

2.5. Research Writing

Research writing perceptions play an essential role in post-PhD researchers' effectiveness as writers and therefore as researchers. These can be defined as mental representations, practices and habits about research writing and themselves as writers (Castelló, McAlpine, and Pyhältö 2017; Lonka et al. 2014; Lonka et al. 2018; Sala-Bubaré, Peltonen, Pyhältö & Castelló, 2018). This section of the survey includes five sub-scales including total of 16 items measuring the two dimensions of academic writing perceptions: adaptive and maladaptive writing perceptions. *Adaptive perceptions* consist of *productivity* (Lonka et al. 2014) and the consideration of writing as a way to *create knowledge* (Bereiter & Scardamalia, 1987), so that individuals enjoy investing in writing activities. *Maladaptive perceptions* are suggested to include *blocks* (Rose, 1980), *procrastination* (Lonka et al., 2014), *perfectionism* (Boice, 1993) and the perception of writing as an *innate ability* (Sawyer, 2009), the result being that researchers may avoid investing in functional activities that would advance their writing. The sub-scales of research writing perceptions are:

a) *Blocks & procrastination,* including inability to write productively and pattern of postponing or failing to start tasks that are important in terms of success; such behaviour undercuts their productivity.

b) *Perfectionism,* referring to constant insistence on a perfect product, with the result that one attempts to rework on material until it is free of all flaws, or ultimately gives up the effort.

c) *Innate ability,* referring to belief that the ability to learn is determined at birth, was one important dimension

d) *Knowledge transforming,* to understand academic writing in terms of transforming instead of knowledge production.

e) *Productivity, perceiving* oneself as a productive and active writer i.e. having strong efficacy beliefs as a writer

Table 5. Items included in the research writing scale (Cronbachs alpha, Mean, Standard Deviation, and Item-total correlation

Instruction: *Rate the following statements about your academic writing experience.*

	Alpha	M	SD	ITr
Productivity (PR)	.86	3.79	1.41	-
PR1 I produce a large number of finished texts.		3.81	1.70	.73
PR2 I am a regular and productive writer.		3.96	1.57	.77
PR3 I write whenever I have the chance.		3.54	1.67	.72
PR4 I write regularly regardless of the mood I am in.		3.86	1.76	.63
Blocks & procrastination (BP)	.83	3.86	1.32	-
BP1 I sometimes get completely stuck if I have to produce texts.		3.72	1.87	.70
BP2 I find it difficult to start writing.		4.13	1.89	.69
BP3 Without deadlines I would not produce anything.		4.02	1.86	.48
BP4 I find it difficult to write, because I am too critical.		4.07	1.76	.63
BP5 My previous writing experiences are mostly negative.		2.81	1.62	.54
BP6 I often postpone writing tasks until the last moment.		4.39	1.77	.57
Knowledge transforming (KT)	.76	5.63	1.23	-
KT1 Writing often means new creating ideas and ways of expressing oneself.		5.35	1.59	.66
KT2 Writing develops thinking.		6.08	1.39	.64
KT3 Writing is a creative activity.		5.47	1.50	.47
Innate ability (IA)	.72	2.05	1.11	-
IA1 Writing is a skill which cannot be taught.		1.95	1.43	.56
IA2 The skill of writing is something we are born with; it is not possible for all of us to learn it.		2.11	1.36	.58
IA3 Writing is difficult because the ideas I produce seem stupid.		2.09	1.36	.48

We recommend that all subscale scores be calculated as arithmetic means of the variables included in the scale.

2.6.   Research conceptions

Research conceptions refers to the personal meaning experiencing research i.e. what does carrying out research and being a researcher means to a doctoral student (Åkerlind, 2008; Pitcher & Åkerlind, 2009; Stubb, Pyhältö & Lonka, 2012). This section of the survey comprises of three sub-scales including total of 6 items measuring the two dimensions of research conceptions: individual-process

oriented –conception (RPD), community-process oriented-conception (RP) and community-product oriented conception (RA) about research. The scales draw on a set of prior qualitative studies on research conceptions (see e.g. Brew, 2001; Stubb et al, 2012; Åkerlind, 2008). The sub-scales of research conceptions are:

a) *Research as personal development and growth*, comprising of personal learning and growth.

b) *Research as scientific advancement*, referring to answering questions, solving problems and extending knowledge.

Table 6. Items included in the research conceptions scale (Cronbach's alpha, Mean, Standard Deviation, and Item-total correlation

Instruction: Rate *the following statements concerning what doing research means to you.*
The sub-scales of research conceptions are:

	Alpha	M	SD	ITr
Personal development & growth (PDG)	.61	4.28	1.29	
PDG1 Doing research is a matter of personal development.		4.64	1.40	.44
PDG2 Doing research has to do with completing what you promise to do (a doctorate, a grant, etc...).		3.91	1.63	.44
Scientific advancement (SA)	.70	4.31	1.12	
SA1 Doing research is basically about comparison, for instance, new and previous results are compared.		3.83	1.59	.52
SA2 Doing research is a kind of struggle, so you have to think about the topic carefully and decide what would be so interesting that you would have the strength to study it.		4.16	1.63	.57
SA3 In doing research you gather different pieces of information and synthesize them in a meaningful way, or you assemble them in some coherent form.		4.57	1.44	.49
SA4 Doing research has to do with having your papers published and others reading them.		4.67	1.53	.38

We recommend that all subscale scores be calculated as arithmetic means of the variables included in the scale.

3. Administering and scoring the C-PDR survey

The six sections of the C-PDR can be used together or singly. Within each section, the different scales can also be used separately. Scales are computed by summing the items of the scale and taking their mean. The instrument is designed to be modular and can be used to fit the needs of the researcher. It can be given in lecture or online and takes approximately 20 minutes administration time when all six sections are administered. Because self-report measures of PhD experience can generally be subject to response bias under unfavorable circumstances, the C-PDR should preferably be administered on a voluntary basis, and the data be used in a depersonalized way. Particular, attention should be paid on sustaining participants' anonymity in reporting the results since number of post-PhD researchers within university and within a discipline is typically somewhat low, which means researchers maybe easily identified by their supervisors, peers or other faculty members.

4. C-PDR survey

The following C-PDR survey entails also open-ended questions that complement the scales. Also, the instructions for the scales used can be found here.

THE CROSS-COUNTRY POST-PHD RESEARCHER EXPERIENCE SURVEY (C-PDR)

Interest in post-doc research

Evaluate the following statements about your interest in Post-doc research. I'm doing post-doc research because …	1(=strongly disagree) ... 7(=strongly agree)						
I am inspired by my research topic.							
I want to get a better position.	1	2	3	4	5	6	7
I enjoy intellectual challenges.	1	2	3	4	5	6	7
I want to work in a research community.	1	2	3	4	5	6	7
I want to get a better salary.	1	2	3	4	5	6	7
I want to develop my skills.	1	2	3	4	5	6	7
I want to have a doctoral degree.	1	2	3	4	5	6	7
Finding out new things is fascinating.	1	2	3	4	5	6	7
After having my PhD, I got a post-doc position at a university	1	2	3	4	5	6	7
I want to develop myself.	1	2	3	4	5	6	7
I want to complete what I started.	1	2	3	4	5	6	7
My research is useful for others.	1	2	3	4	5	6	7
Degree is required in my future work.	1	2	3	4	5	6	7
I did not have other career prospects in sight.	1	2	3	4	5	6	7
I want to contribute to my field of research.	1	2	3	4	5	6	7
My job prospects are better after doctoral degree.	1	2	3	4	5	6	7
I am inspired by the work as researcher.	1	2	3	4	5	6	7

Some other reason, please specify

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_____

_____

Supervisory and researcher community support

Rate the following statements about your researcher community and supervision	1(=not at all) ... 7(=very often)						
I often receive constructive criticism.	1	2	3	4	5	6	7
My expertise is put use in the research community.	1	2	3	4	5	6	7
I feel that I am treated with respect.	1	2	3	4	5	6	7
I feel that the other members of my research community appreciate my work.	1	2	3	4	5	6	7
I receive encouragement and personal attention from my supervisor(s).	1	2	3	4	5	6	7
I feel that my supervisor(s) appreciate my work.	1	2	3	4	5	6	7
I feel accepted by my research community.	1	2	3	4	5	6	7
I feel appreciated by my supervisor(s).	1	2	3	4	5	6	7
There is a good sense of collegiality among the researchers I interact with.	1	2	3	4	5	6	7
I feel like an outsider in my own research community.	1	2	3	4	5	6	7
I can openly discuss any problems related to my doctoral education/post-doc research with my supervisor(s).	1	2	3	4	5	6	7
I receive encouragement and support from the other researchers.	1	2	3	4	5	6	7

Satisfaction with your supervision	1(=unsatisfied) … 7(=completely satisfied)						
Are you satisfied with your supervision?	1	2	3	4	5	6	7

Please state the reasons.

_____

_____

Engagement in post-doc research

Rate the following statements about your engagement in your research.	1(=not at all) ... 7(=very often)						
When I conduct research, I feel that I am bursting with energy.	1	2	3	4	5	6	7
I find the research that I do full of meaning.	1	2	3	4	5	6	7
Time flies when I'm doing my research.	1	2	3	4	5	6	7
When doing my research, I feel vigorous.	1	2	3	4	5	6	7
I am enthusiastic about my research	1	2	3	4	5	6	7
When I am doing my research, I forget everything else around me.	1	2	3	4	5	6	7
My research inspires me.	1	2	3	4	5	6	7
I feel happy when I start working on my research.	1	2	3	4	5	6	7

I am immersed in my research.	1 2 3 4 5 6 7

Post-doc work burnout

Rate the following statements about your experience of doctoral studies/post-doc work.	1(=strongly disagree) ... 7(=strongly agree)
I feel overwhelmed by the workload of my post-doc work.	1 2 3 4 5 6 7
I feel my post-doc work is useless.	1 2 3 4 5 6 7
I often have feelings of inadequacy in my post-doc work.	1 2 3 4 5 6 7
I often sleep badly because of matters related to my post-doc work.	1 2 3 4 5 6 7
I feel that I am losing interest in my post-doc work.	1 2 3 4 5 6 7
I feel burned out.	1 2 3 4 5 6 7
I have difficulties in finding any meaning to my post-doc work.	1 2 3 4 5 6 7
I brood over matters related to post-doc work a lot during my free time.	1 2 3 4 5 6 7
I used to have higher expectations of my post-doc work than I do now.	1 2 3 4 5 6 7
The pressure of my post-doc work causes me problems in my close relationships with others.	1 2 3 4 5 6 7
I often feel that I fail at my post-doc work.	1 2 3 4 5 6 7
Stress means feeling nervous, uneasy, distressed or having difficulties sleeping because of things that are bothering you.	1(=not at all) ... 7(very often)
Do you have such feelings?	1 2 3 4 5 6 7

Satisfaction with training and post-doc journey

Rate the following statements about your post-doc journey.

	1(=strongly disagree) … 7(=strongly agree)
The training provided by the faculty/university is in line with my needs.	1 2 3 4 5 6 7
Are you satisfied with your post-doc work?	1(=unsatisfied) … 7(=completely satisfied) 1 2 3 4 5 6 7

Academic Writing

Rate the following statements about your academic writing experience.	1(=not at all) ... 7(=very often)						
I often postpone writing tasks until the last moment.	1	2	3	4	5	6	7
Writing is a creative activity.	1	2	3	4	5	6	7
I find it difficult to write, because I am too critical.	1	2	3	4	5	6	7
My previous writing experiences are mostly negative.	1	2	3	4	5	6	7
I write regularly regardless of the mood I am in.	1	2	3	4	5	6	7
I produce a large number of finished texts.	1	2	3	4	5	6	7
Without deadlines I would not produce anything.	1	2	3	4	5	6	7
I sometimes get completely stuck if I have to produce texts.	1	2	3	4	5	6	7
I find it difficult to start writing.	1	2	3	4	5	6	7
I find it easier to express myself in other ways than writing.	1	2	3	4	5	6	7
I only write when the situation is peaceful enough.	1	2	3	4	5	6	7
The skill of writing is something we are born with; it is not possible for all of us to learn it.	1	2	3	4	5	6	7
I find it difficult to hand over my texts, because they never seem complete.	1	2	3	4	5	6	7
I start writing only if it is absolutely necessary.	1	2	3	4	5	6	7
I hate writing.	1	2	3	4	5	6	7
I am a regular and productive writer.	1	2	3	4	5	6	7
I could revise my texts endlessly.	1	2	3	4	5	6	7
I write whenever I have the chance.	1	2	3	4	5	6	7
Writing is a skill which cannot be taught.	1	2	3	4	5	6	7
Writing is difficult because the ideas I produce seem stupid.	1	2	3	4	5	6	7
Writing often means new creating ideas and ways of expressing oneself.	1	2	3	4	5	6	7
Writing develops thinking.	1	2	3	4	5	6	7

Research conceptions

Rate the following statements concerning what doing research means to you.	1(=strongly disagree) ... 7(=strongly agree)						
Doing research has to do with having your papers published and others reading them.	1	2	3	4	5	6	7
Doing research is a kind of struggle, so you have to think about the topic carefully and decide what would be so interesting that you would have the strength to study it.	1	2	3	4	5	6	7
Doing research is basically about comparison, for instance, new and previous results are compared.	1	2	3	4	5	6	7
In doing research you gather different pieces of information and synthesize them in a meaningful way, or you assemble them in some coherent form.	1	2	3	4	5	6	7
Doing research is a matter of personal development.	1	2	3	4	5	6	7
Doing research has to do with completing what you promise to do (a doctorate, a grant, etc…).	1	2	3	4	5	6	7

The following statements concern your national and international researcher collaboration. Next to each statement, choose the item which best represents the frequency which with you have done the activity from the beginning of your post-doc work.

	Never	Between 1-2 times	Between 3-4 times	Between 5-6 times	More than 6 times
I have done research projects with other researchers in my country that include my post-doc supervisor.					
I have done research projects with other researchers in my country that do not include my post-doc supervisor.					
I have co-authored papers with other researchers in my country that include my post-doc supervisor.					
I have co-authored papers with other researchers in my country that do not include my post-doc supervisor.					
I have presented at national conferences.					
I have co-authored papers with international researchers.					
I have participated in international courses or summer schools.					
I have presented at international conferences.					

How many publications have you had?

Number of publications as a first author in a peer-reviewed journal or book

Number of publications as a first author in a non peer-reviewed journal or book

Number of publications in a peer-reviewed journal or book not as a first author

Number of publications in a non peer-reviewed journal or book not as a first author

Have you done a research stage or have an invitation abroad during your post-doc work?

☐ Yes
☐ No

In what context have you done your research stage or invitation abroad?
(mark as many options as you consider appropriate)

☐ As a Post-doc
☐ As an invited researcher
☐ Other

What best represents how you go about your research?

☐ Mainly on my own
☐ As much on my own as in research team or teams
☐ Mainly in a research team or teams

Have you considered dropping out of your post-doc work?

☐ Yes
☐ No

State briefly the reasons why you considered dropping out of your doctoral studies.
_____

_____

Have you ever interrupted your post-doc work?

☐ Yes
☐ No

State briefly the reasons why you interrupted your post-doc work.

_____

_____

Satisfaction with training and post-doc journey

Rate the following statements about your post-doc journey.

The training provided by the faculty/university is in line with my needs.	1(=strongly disagree) … 7(=strongly agree) 1 2 3 4 5 6 7
Are you satisfied with your post-doc work?	1(=unsatisfied) … 7(=completely satisfied) 1 2 3 4 5 6 7

Indicate what kind of work you would like to do after completing your present post-doc by choosing only one of the following options.

- [ ] Lecturer at a research intensive university
- [ ] Lecturer at a non research intensive university
- [ ] Postdoc fellowship
- [ ] Researcher in a university
- [ ] Researcher in the private sector
- [ ] Researcher in government
- [ ] Administrator in a college or university
- [ ] Teacher/ administrator at elementary or secondary level
- [ ] Administrator or manager in the private sector
- [ ] Administrator or manager in government
- [ ] Returning to, or continuing, in the same employment/position
- [ ] Professional (self-employed or in an agency)
- [ ] Other

Please answer briefly the following questions regarding the role of your work in your personal life

In thinking beyond your post-doc work, what other features of your life (e.g., family, partner, physical activity) influence how you go about your academic work?

_____

_____

Why?

_____

_____

To what extent do you feel you are able to achieve work-life balance?

_____

_____

What challenges and/or strategies contribute to this balance (or lack thereof)?

_____

_____

Year of birth _____

Have you any children?

☐ No
☐ Yes

If you have children, please indicate how many _____

Doing research entails different kind of events and turning points, both positive and negative. Please, describe briefly your experiences related to different moments.

Positive turning points

The most positive event or experience from the beginning of my doctoral journey until now was when... (please note when, where and who was involved)

_____

_____

This event or experience was important to me because...

_____

_____

At that time I felt...

_____

_____

In relation to this, now, I feel...

_____

_____

Negative turning points

The most negative event or experience from the beginning of my doctoral journey until now was when... (please note when, where and who was involved)

_____

_____

In that moment, what I did was...

_____

_____

This event or experience was important to me because...

_____

_____

At that time I felt...

_____

_____

In relation to this, now, I feel...

_____

_____

THANK YOU FOR YOUR ANSWERS!

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APPENDIX 1. Intercorrelations of the scale items

Research interest scale

	RCS2	RCS3	RCS4	RCS5	RCS6	RCS7	SS1	SS2	SS3	SS4
RCS1	.78	.61	.63	.73	.53	.54	.59	.57	.54	.47
RCS2	-	.64	.58	.65	.56	.44	.58	.58	.54	.44
RCS3		-	.44	.62	.63	.36	.49	.53	.48	.56
RCS4			-	.58	.50	.58	.51	.50	.49	.46
RCS5				-	.55	.56	.72	.71	.67	.66
RCS6					-	.41	.55	.61	.53	.52
RCS7						-	.60	.53	.59	.48
SS1							-	.93	.88	.76
SS2								-	.86	.78
SS3									-	.79

Supervisory and researcher community support scale

	RCS2	RCS3	RCS4	RCS5	RCS6	RCS7	SS1	SS2	SS3	SS4
RCS1	.78	.61	.63	.73	.53	.54	.59	.57	.54	.47
RCS2	-	.64	.58	.65	.56	.44	.58	.58	.54	.44
RCS3		-	.44	.62	.63	.36	.49	.53	.48	.56
RCS4			-	.58	.50	.58	.51	.50	.49	.46
RCS5				-	.55	.56	.72	.71	.67	.66
RCS6					-	.41	.55	.61	.53	.52
RCS7						-	.60	.53	.59	.48
SS1							-	.93	.88	.76
SS2								-	.86	.78
SS3									-	.79

Engagement in research scale

	EG2	EG3	EG4	EG5	EG6	EG7	EG8	EG9
EG1	.77	.80	.73	.73	.76	.70	.67	.60
EG2	-	.74	.77	.70	.72	.74	.72	.60
EG3		-	.69	.70	.72	.73	.66	.62
EG4			-	.74	.70	.67	.72	.59
EG5				-	.62	.69	.65	.64
EG6					-	.60	.65	.59
EG7						-	.66	.50
EG8							-	.66

Burnout scale (Cynicism and Exhaustion)

	EX2	EX3	EX4	CY1	CY2	CY3	CY4	CY5	CY6
EX1	.59	.48	.44	.33	.41	.50	.54	.22	.43
EX2	-	.43	.42	.28	.35	.37	.48	.14	.36
EX3		-	.33	.25	.20	.34	.37	.11	.30
EX4			-	.19	.30	.35	.41	.19	.23
CY1				-	.71	.62	.62	.65	.53
CY2					-	.65	.65	.58	.55
CY3						-	.57	.51	.52
CY4							-	.42	.51
CY5								-	.49

Research writing scale

	PR2	PR3	PR4	BP1	BP2	BP3	BP4	BP5	BP6	KT1	KT2	KT3	IA1	IA2	IA3
PR1	.75	.60	.53	-.19	-.32	-.12	-.32	-.15	-.35	.08	.05	.16	.14	-.01	-.03
PR2	-	.66	.54	-.24	-.39	-.16	-.34	-.26	-.38	.24	.22	.26	.09	.00	-.03
PR3		-	.59	-.17	-.38	-.19	-.25	-.15	-.35	.23	.19	.24	.18	.00	.08
PR4			-	-.17	-.32	-.09	-.19	-.05	-.26	.12	.22	.22	.19	-.04	.05
BP1				-	.69	.46	.54	.46	.39	.15	.06	-.01	.12	.16	.35
BP2					-	.37	.53	.41	.49	.04	.06	-.09	.06	.17	.30
BP3						-	.32	.29	.38	.06	-.01	-.02	.08	.06	.13
BP4							-	.48	.48	.12	.12	.06	.12	.17	.29
BP5								-	.40	.02	-.02	-.02	.23	.15	.41
BP6									-	.10	.07	.00	.06	.22	.21
KT1										-	.67	.45	.00	.02	-.05
KT2											-	.41	-.13	-.04	-.11
KT3												-	.05	.04	-.11
IA1													-	.54	.41
IA2														-	.43

Research conceptions scale

	PDG2	SA1	SA2	SA3	SA4
PDG1	.44	.26	.39	.50	.19
PDG2	-	.22	.25	.32	.19
SA1		-	.50	.40	.27
SA2			-	.42	.35
SA3				-	.29