ERCAREER ERC-Support-2012-1 (317442) Final Report – short version (June 2014)
Capturing career paths of ERC grantees and applicants: Promoting sustainable excellence in research careers

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Excellence is a non-negotiable in science, as a necessary condition for success in terms of careers and funding. Scientific excellence is the sole criterion on the basis of which European Research Council (ERC) frontier research grants are awarded. The ERC's peer review evaluation process has been carefully designed to identify scientific excellence irrespective of the gender, age, nationality or institution of the Principal Investigator and other potential biases, and to take career breaks as well as unconventional research career paths into account. The evaluations are monitored to guarantee transparency, fairness and impartiality in the treatment of proposals. Despite these efforts, persistent inequalities exist between men and women scientists in ERC funding success as well as other career outcomes. At the same time, career systems put in place in research producing organizations (RPOs) and research funding organizations (RFOs) to promote excellence may not be sustainable, however, as they may no longer guarantee optimal outcomes under changing demographic conditions. On account of increasing labor force participation of women and growing numbers of dual earner and single parent households, low fertility, and low mortality, as are common to most industrialized nations, career systems that rely on breadwinner models are becoming obsolete. Allowing unconventional careers is one way in which the ERC as well as other RPOs and RFOs deal with these issues. In order for this allowance to be effective, we need to know more about career patterns and (un) conventions in science. Despite the ubiquitous presence of the term “career patterns” in the discourse about careers in science, the existing empirical evidence is limited.

Within the context of ERCAREER, funded by the ERC (CSA-2012), we took a multimethod - multisource approach in studying career patterns and conventions in science, using CV analysis (from application data in the ERCEA database), a career history survey, and interviews with ERC applicants and grantees, men and women, from various countries, from the Starting (StG) and the Advanced (AdG) Grant populations. Our main objective was to map the road to excellence, by looking at (un-) conventional careers; and to chart the institutional role in shaping research careers for those with care responsibilities.

On the basis of our initial analysis of 180 CVs extracted from the ERCEA applications database, we conclude that CVs are certainly interesting (we used the CV coding scheme we developed as input for our survey) but incomplete on breaks and “care” and inconsistent across countries and disciplines, which made the collection of additional data on and Optimal Matching Analyses of career histories necessary. *We recommend improving consistency and comparability of career history information in the application and evaluation process.* In addition, the exemption requests submitted by applicants (for an extension of the window or for a change of career stage) are very informative. The framing and language applicants use in their request differs by country and discipline, which requires content analysis outside the scope of this project. The overall success ratio for those who requested an exemption does not appear to be different compared to non-exemptions, but a possible interaction with gender warrants further

analysis. We identified the dilemma of disclosure: providing family or other personal information to qualify for an exemption appeals to notions of fairness and entitlement but at the same time may induce fear of stigma. *We recommend improving the guidance given and handling of exemption requests in the application and evaluation process.*

Next, we collected new career history data from applicants who had given consent using a survey. The "career inventory" was sent to men and women, from all domains, all countries, grantees and applicants, from the StG 2012 and AdG 2008-2012 applicant population. The response rate was 20%, and our sample consists of 339 StG and 746 AdG respondents. On the full career history data we performed a specific type of sequence analysis, namely multichannel Optimal Matching Analysis (OMA) to identify unique patterns. On the basis of each individual's sequence of positions held and institutions worked at since obtaining a PhD, the analysis generated 5 unique career patterns for both StG and AdG, labeled as dances. The dances metaphor was inspired by Aisenbrey and Fasang's (2010) call for using OMA to study the rhythms and patterns of life courses. Each pattern reflects meaningful and recognizable combinations of positional and institutional sequences, different progression logics, and movements. As an example, for both the StG and AdG samples, the *Tango* pattern represent complicated moves (upward, lateral, or downward mobility; transitions in and out of employment) across various settings (university, research institutions, government, industry, etc.). In contrast, the *Viennese Waltz* pattern represents steady upward progress within university settings. The graphic visualization of the patterns is given in the figures below. A key result is that excellence in terms of application success is found in all patterns, albeit to different extent.

Within each pattern, there are distinct representations of grantees, domains, men and women. In the attached tables the main descriptive statistics for each of the patterns are represented. The *Waltz* pattern (steady progress in universities, saturated) has the highest grantee ratio among AdG applicants, with a mean career length of 32,6 years apparently a "life time achievement award". The *Foxtrot* pattern (steady progress in research institutions, especially in the Life Sciences domain) has the highest grantee ratio among the StG applicants. The StG *Quick Step* pattern (early advances in universities; namely a full professor position within about 8 years out of PhD, via the typical route of post-doc, assistant, associate, with one or two mobility events, often international) has a higher grantee ratio compared to the other two career patterns in universities; this also is the pattern with the highest incidence of children born before/during PhD and of partners not working full time. We observe higher proportions of women in patterns that have lower grantee ratios for both StG and AdG patterns. For AdG especially it appears that "conventional" patterns have higher grantee ratio's than less conventional.

In addition to the career history survey, we held interviews with 27 applicants and grantees, men and women, from the Life Sciences domain. The interviews provided rich data for understanding the lived experiences behind the career patterns. In terms of excellence, early successes are said to be crucial for independence. Independence is perceived as both a condition for and a consequence of a grant or promotion. Mobility clearly has various causes and consequences, but the importance often attached to a stay in the USA appears subject to change, and is context specific. Networks as a crucial source of support can both positively and negatively be affected by mobility. From both the survey and the interviews, it is evident that despite variations in length and pattern, for the most part an *upward* career direction fits our respondents' personal career narratives, reflecting the unique nature of this sample.

In terms of ERC-application experiences, beyond a general appreciation for the ERC and its grant schemes, there is evidence of complications inherent to the institutional submission process (sifting, various forms of support, etc.), as well some frustration with ERC selection processes, procedures, location, and facilities. Being labeled "not really a starter" by ERC reviewers despite meeting the formal requirements for an exemption is a clear disqualifier, and it is not evident when

"outside" or medical experience counts as relevant. In experiences with ERC panels the interviewees report some instances of gender bias, decision bias, and other inherent consequences of a relative or intransitive selection process. Finally, in the ERC granting process, especially Nordic interviewees report incongruencies between national systems and ERC rules that play out to their disadvantage.

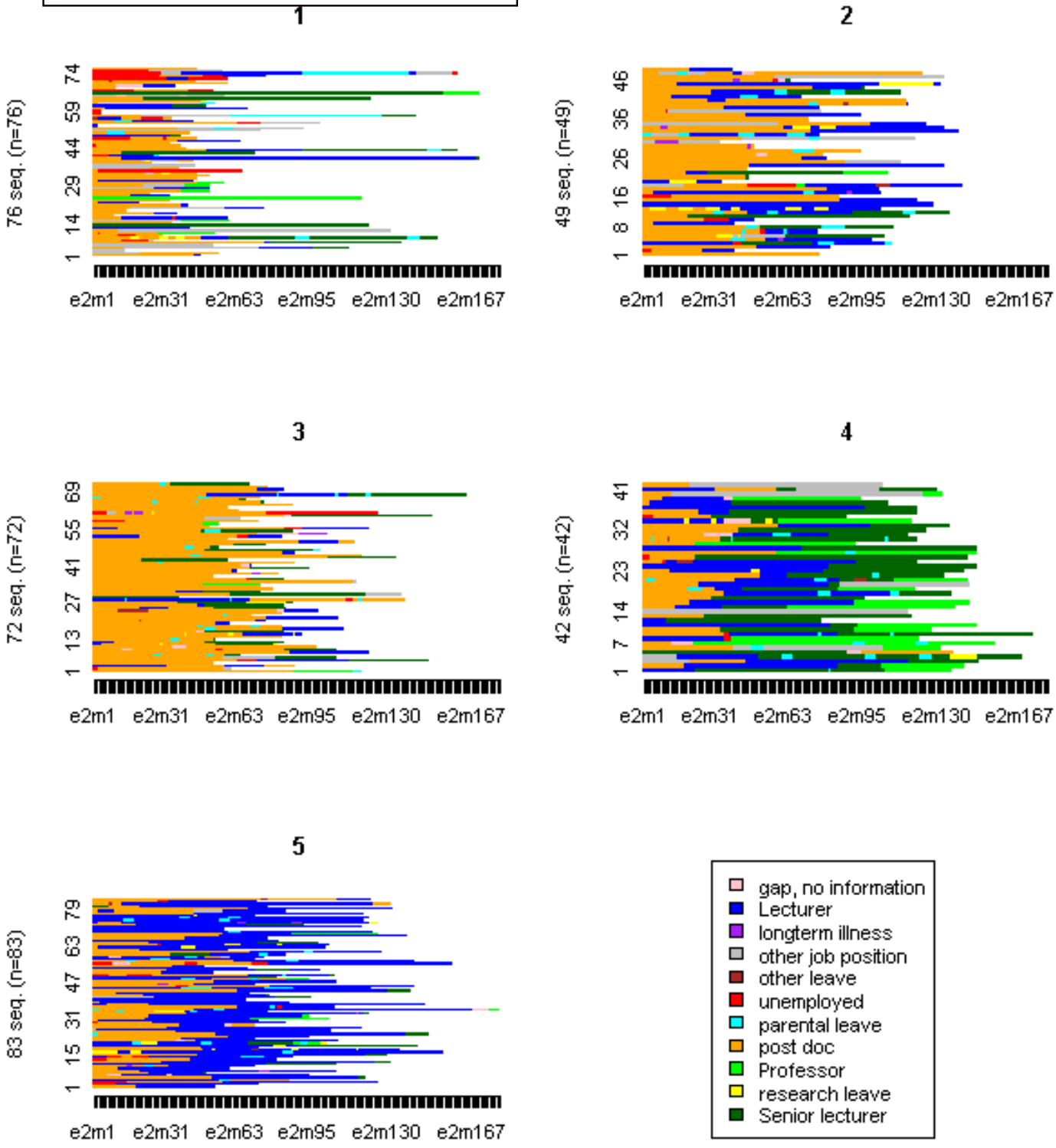
A major theme that emerged from both the survey and the interviews is the extremely high incidence of dual careers among our sample, and especially dual careers in science. We find evidence of different solutions in combining dual careers and care (50/50, shifts, etc.), as well as of different career priority patterns (competing, synchronized, independent). Couples find making care arrangements for the fringes of the day and when travelling more problematic than the regular 9 to 5, for which they strongly depend on extended family support. In order to combine career and care responsibilities, our sample has taken various forms of (informal, formal, statutory) leave but not always full-time, and 10% of men and 20% of women has worked part-time at some point in their career. Formal compensation for leave in selection and promotion criteria and adjustment for part-time employment is not yet common (the ERC makes no adjustment for the latter) but known. The flexibility of scientific work is very important for many. Some extra-ordinary institutional support is evident, and supervisor support appears to be crucial but ad hoc. Finally our interviewees tell various stories of how everything was fine until a first degree family member became ill (for which the ERC made no exemption until recently), or of when the carefully worked out system of care arrangements failed or broke down. Many struggle with fitting their own reality to match career conventions.

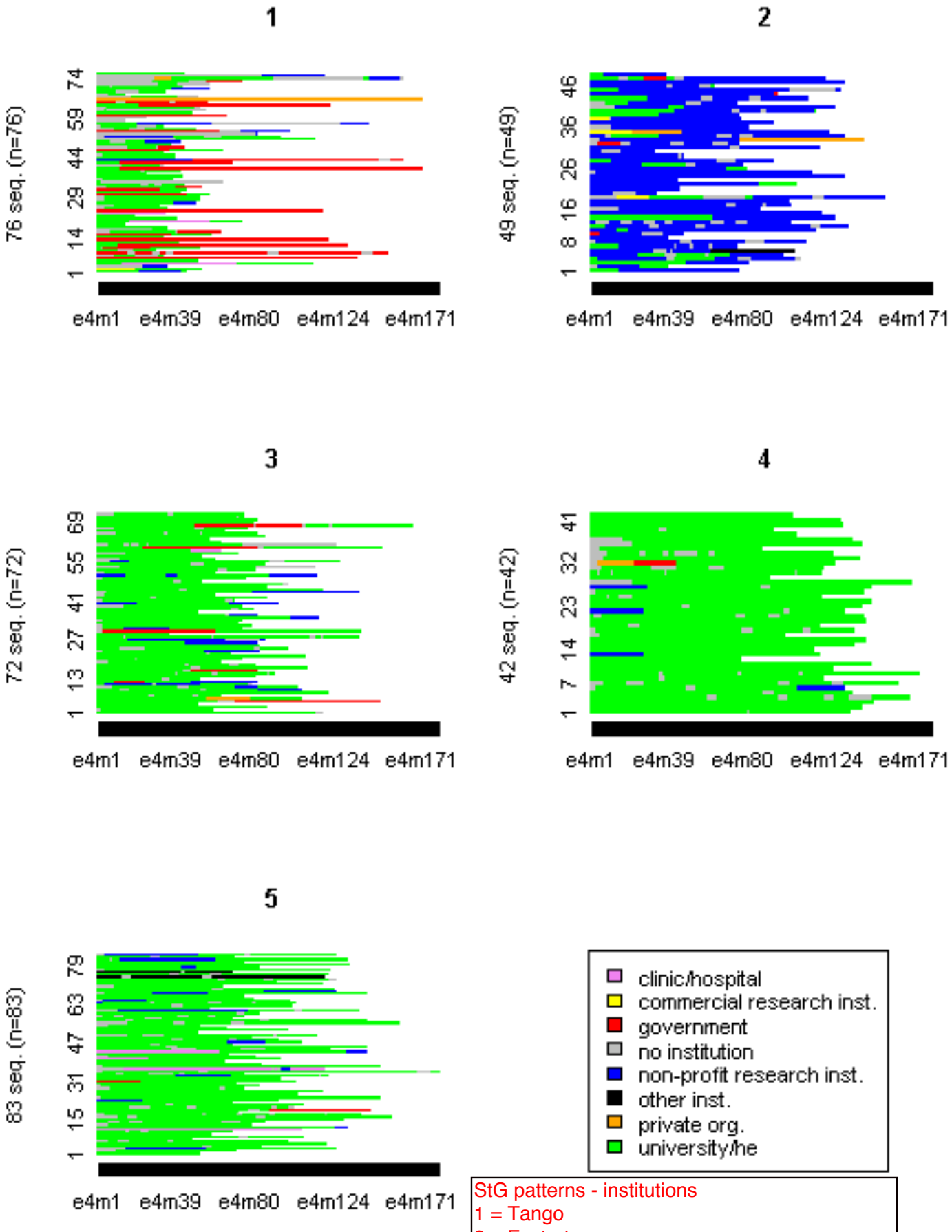
In our analysis of the data we have identified several dilemmas, the most pressing of which are the dilemma of disclosure of parental status / leave / part-time in a grant application: this may induce a sense of entitlement but also stigma for the applicant. Similarly, there is a dilemma in trying to reduce bureaucracy in the application and selection process: post- bureaucratic processes often induce bias. Finally, there is a dilemma inherent to wanting "excellence only": can reviewers judge excellence without career information (e.g. in terms of full time research years since PhD)?

On the basis of our data and our experiences in this CSA project, taking into account several limitations, we have formulated various recommendations, related to a) optimizing and standardizing the career information section in application form; b) improving the allowance of and communication about unconventional careers; c) choosing between different options for removing the "spillover" effect from exemption judgment to excellence judgment; d) optimize exemption and extension calculation and decision making process; e) optimize reviewing process (e.g. replace breadwinner lens by dual career lens); f) promoting excellence only: "we truly do not care how / when you get there". Additionally, in maintaining a dialogue with host institutions, we recommend that the ERC incentivizes employer excellence by promoting dual career policies, compensation policies for time to care for applicants and grantees, and accreditation such as the Athene Swan system.

The evidence presented here on career patterns, dual careers, and career conventions on selection and promotion decisions, and of allowing unconventional careers on objective career outcomes, enhances our understanding of gender and careers in science and will help develop evidence-based policies to promote sustainable excellence and to achieve greater gender balance among ERC applicants and grantees.

StG patterns - positions
1 = Tango
2 = Foxtrot
3 = Slow Waltz
4 = Quick Step
6 = Viennese Waltz

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e4m1 e4m39 e4m80 e4m124 e4m171
3
72 seq. (n=72)
1 13 27 41 55 69
e4m1 e4m39 e4m80 e4m124 e4m171
4
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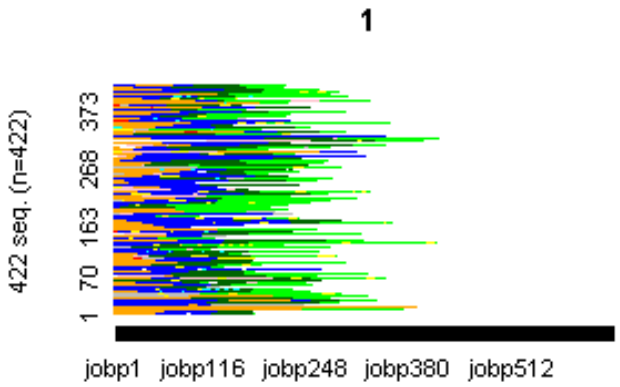
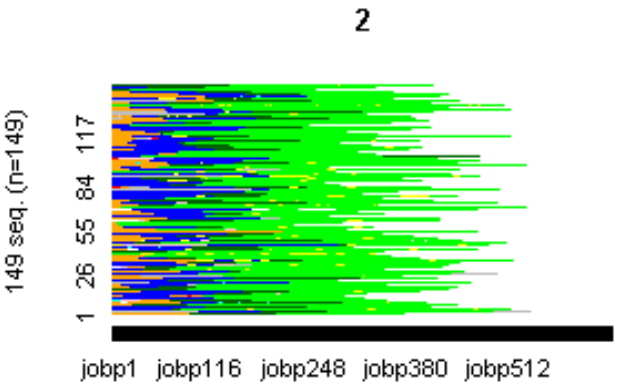
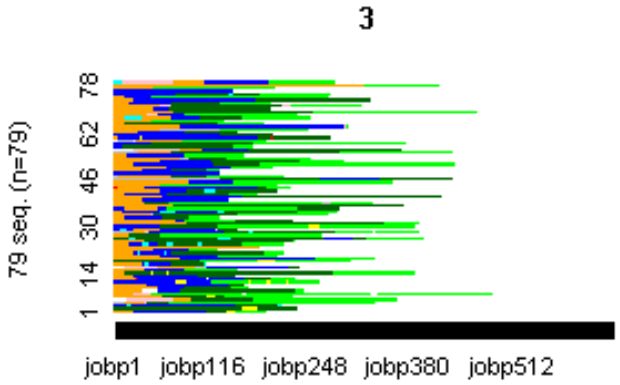
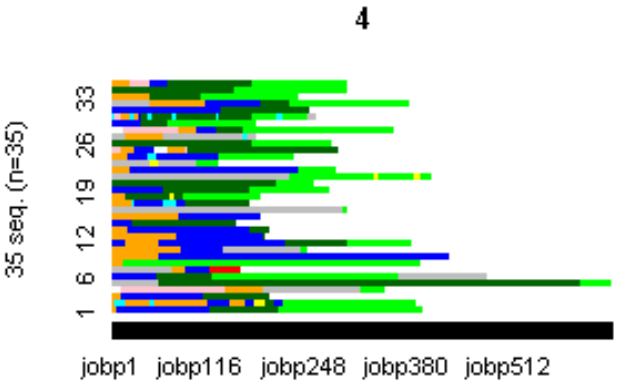
1 7 14 23 32 41
e4m1 e4m39 e4m80 e4m124 e4m171
5
83 seq. (n=83)
1 15 31 47 63 79
e4m1 e4m39 e4m80 e4m124 e4m171
clinic/hospital
commercial research inst.
government
no institution
non-profit research inst.
other inst.
private org.
university/he
StG patterns - institutions
1 = Tango
2 = Foxtrot
3 = Slow Waltz
4 = Quick Step
6 = Viennese Waltz

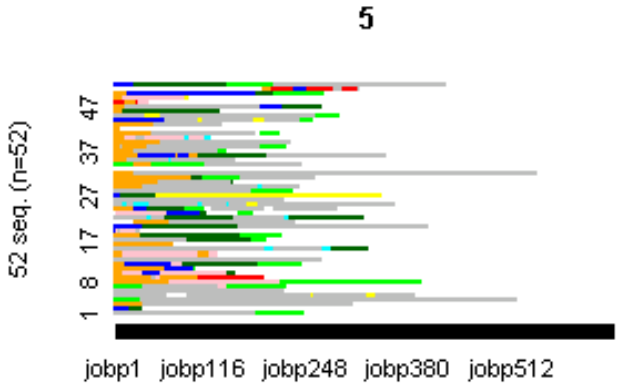
AdG patterns - positions
1 = Viennese Waltz
2 = Waltz
3 = Foxtrot
4 = Jive
6 = Tango



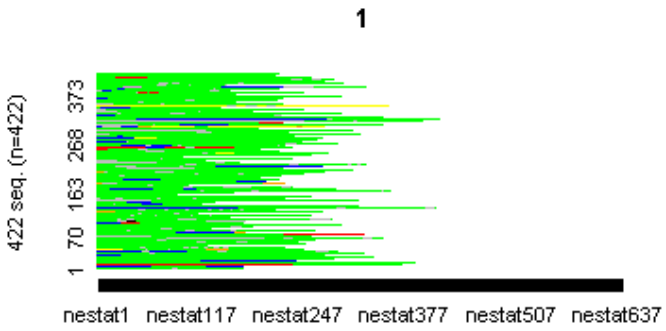


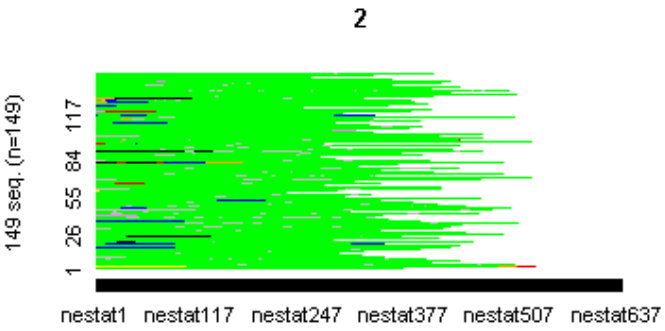


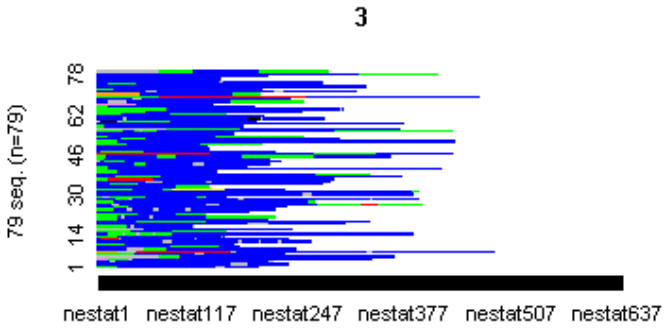


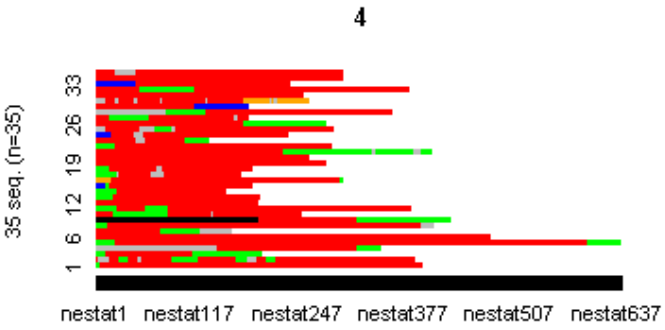


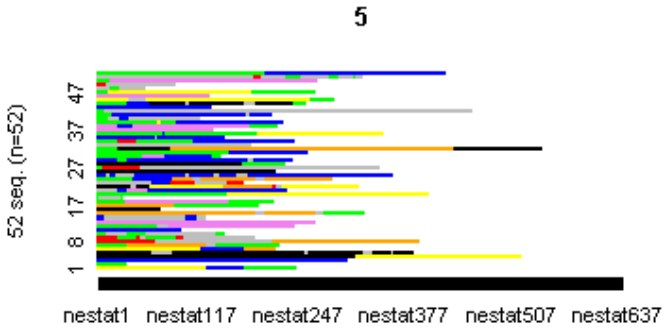
AdG patterns - institutions
1 = Viennese Waltz
2 = Waltz
3 = Foxtrot
4 = Jive
6 = Tango











StG OMA Patterns - full descriptives	1 Tango complicated moves various settings	2 Foxtrot steady progress research institutes	3 Slow Waltz repeat performances universities	4 Quick Step early advances universities	5 Viennese Waltz steady progress universities	Total
n	76	49	72	42	83	322
%	23,6	15,2	22,4	13,0	25,8	100,0
mean length of sequences (months)	65	95	89	131	101	93
within-cluster share of sequences						
post doc position	39,9	48,9	73,9	16,4	26,5	42,3
lecturer	15,9	27,3	6,6	21,8	63,3	28,5
senior lecturer	7,3	6,7	11,9	32,3	3,1	10,4
professor	3,4	0,4	1,0	15,6	1,1	3,4
other job	13,4	8,2	1,0	9,5	0,5	6,0
unemployment	7,0	1,5	1,3	0,3	1,1	2,5
research leave	0,3	2,1	0,4	0,4	0,8	0,8
parental leave	2,0	2,5	1,2	1,3	1,7	1,7
other leave	0,1	1,0	0,5	0,3	0,3	0,4
gap	1,8	0,3	0,6	0,8	0,4	0,8
university/higher education	50,9	11,4	83,6	92,4	84,3	66,2
non-profit research institute	4,6	76,2	6,6	2,0	4,0	15,5
commercial research institute	0,5	0,8	0,0	0,0	0,0	0,2
hospital/clinic	2,6	0,0	0,3	0,0	0,3	1,4
government	19,5	0,8	3,2	0,4	0,7	5,7
private organisation	1,4	0,3	0,4	0,0	0,7	1,4
other institution	0,0	0,8	0,0	0,0	2,3	0,7
characteristics (%)						
domain						
LS	30,3	55,1	43,1	28,6	33,7	37,6
PE	44,7	38,8	37,5	45,2	44,6	42,2
SH	25,0	6,1	19,4	26,2	21,7	20,2
grant	13,2	24,5	18,1	23,8	15,7	18,0
women	44,7	51,0	36,1	26,2	37,4	39,4
applying country						
other *	11,8	4,1	4,2	7,1	3,6	6,2
AL, BA, CY, EL, IL, TR, MT	7,9	8,2	6,9	7,1	7,2	7,5
DK, IS, NO, FI, SE	9,2	2,0	13,9	9,5	7,3	8,7
AT, CH, DE	13,2	22,5	19,4	16,7	24,1	19,3
UK, IE	5,3	8,2	19,4	16,7	10,8	11,8
PT, ES	6,6	24,5	8,3	2,4	12,1	10,6
NL, BE	15,8	6,1	8,3	9,5	12,1	10,9
FR	10,5	16,3	11,1	9,5	7,2	10,6
IT	19,7	8,2	8,3	21,4	15,7	14,6
nationality						
other *	17,1	12,5	8,6	11,9	3,6	10,3
AL, BA, CY, EL, IL, TR, MT	9,2	8,3	7,1	9,5	9,6	8,8
DK, IS, NO, FI, SE	6,6	4,2	8,6	14,3	4,8	7,2
AT, CH, DE	9,2	15,6	11,4	11,9	25,3	15,1
UK, IE	4,0	2,1	14,3	9,5	3,6	6,6
PT, ES	9,2	22,9	8,6	2,4	10,8	10,7
NL, BE	9,2	6,3	5,7	2,4	4,8	6,0
FR	7,9	12,5	12,9	9,5	9,6	10,3
IT	22,4	10,4	18,6	23,8	16,9	18,5
other outside EU **	5,3	6,3	4,3	4,8	10,8	6,6
children before or during phd	14,5	18,4	15,3	26,2	7,2	14,9
partner, not in full-time employment	18,4	16,3	22,2	38,1	30,1	24,5
partner, in full-time employment	56,6	61,2	55,6	59,5	51,8	56,2
international mobility	39,5	73,5	68,1	64,3	54,2	58,1

* = HU, HR, CZ, PL, RO, RS, SI, BG, EE, LT, LV, SK, UA, RU, BY
** = AR, AU, IN, LB, NZ, US, ZA, BR, CR, JP, KR

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AdG OMA patterns - full descriptives	1 Viennese Waltz steady progress universities non-saturated	2 Waltz steady progress universities saturated	3 Foxtrot steady progress research institutes	4 Jive steady progress government	5 Tango complicated moves various settings	Total
n	422	149	79	35	52	737
%	57,3	20,2	10,7	4,8	7,1	100,0
mean length of sequences (months)	243	392	262	291	243	278
within-cluster share of sequences						
post doc position	17,6	6,2	16,8	10,3	12,0	14,4
lecturer	24,0	15,4	23,6	22,2	5,9	20,9
senior lecturer	21,2	11,2	27,1	24,7	9,9	19,2
professor	26,9	61,0	28,1	24,6	7,3	32,4
other job	3,8	3,0	1,3	13,3	44,2	6,6
unemployment	0,4	0,1	0,0	0,7	2,0	0,4
research leave	2,2	2,0	0,6	0,6	2,2	1,9
parental leave	0,9	0,1	0,9	1,0	0,7	0,7
other status	0,7	0,4	0,4	0,5	6,4	1,0
gap	2,3	0,7	1,3	2,2	9,3	2,3
university/higher education	85,1	92,9	15,5	11,7	17,7	71,0
non-profit research institute	4,3	1,4	78,3	2,0	21,1	12,7
commercial research institute	1,2	0,3	0,4	0,0	9,0	1,4
hospital/clinic	0,4	0,3	0,5	0,0	12,0	1,2
government	1,5	0,6	1,6	79,2	2,1	5,1
private organisation	0,7	0,4	0,4	1,0	7,2	1,1
other institution	0,3	0,8	0,2	1,3	10,3	1,1
characteristics (%)						
domain						
LS	28,6	22,8	49,4	40,0	38,5	30,9
PE	44,8	48,3	41,8	51,4	42,3	45,3
SH	26,5	28,9	8,9	8,6	19,2	23,7
grant	22,0	24,8	20,3	11,4	15,4	21,4
women	20,9	10,7	25,3	25,7	23,1	19,7
applying country						
other *	7,4	7,4	12,7	14,3	7,7	8,3
AL, BA, CY, EL, IL, TR, MT	6,2	9,4	1,3	2,9	9,6	6,4
DK, IS, NO, FI, SE	9,2	9,4	3,8	5,7	7,7	8,4
AT, CH, DE	15,4	11,4	12,7	2,9	13,5	13,6
UK, IE	23,0	21,5	5,1	8,6	5,8	18,9
PT, ES	8,5	4,7	17,7	20,0	13,5	9,6
NL, BE	10,7	7,4	10,1	2,9	9,6	9,5
FR	6,2	10,7	25,3	28,6	15,4	10,9
IT	13,5	18,1	11,4	14,3	17,3	14,5
nationality						
other *	8,3	6,8	16,5	14,3	7,7	9,1
AL, BA, CY, EL, IL, TR, MT	6,4	8,8	3,8	5,7	9,6	6,8
DK, IS, NO, FI, SE	8,1	9,5	1,3	2,9	7,7	7,3
AT, CH, DE	14,5	9,5	15,2	2,9	13,5	12,9
UK, IE	18,3	23,0	6,3	8,6	3,9	16,4
PT, ES	6,9	4,1	19,0	20,0	11,5	8,6
NL, BE	12,6	8,1	7,6	2,9	9,6	10,5
FR	6,4	9,5	15,2	25,7	11,5	9,2
IT	15,2	14,9	12,7	17,1	21,2	15,4
other outside EU **	3,6	6,1	2,5	0,0	3,9	3,8
children						
none	17,5	15,4	12,7	25,7	11,5	16,6
1	19,0	12,1	20,3	14,3	23,1	17,8
2	37,4	38,9	45,6	45,7	32,7	38,6
3 and more	26,1	33,6	21,4	14,3	32,7	27,0
partner						
none	18,0	14,8	13,9	14,3	21,2	16,9
partner, not in full-time employment	34,4	41,6	32,9	25,7	44,2	36,0
partner, in full-time employment	47,6	43,6	53,2	60,0	34,6	47,1
inter-organizational mobility	95,5	97,9	97,5	88,6	96,1	95,9

* = HU, HR, CZ, PL, RO, RS, SI, BG, EE, LT, LV, SK, UA, RU, BY
** = AR, AU, IN, LB, NZ, US, ZA, BR, CR, JP, KR

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