

International experience

The dark side of mobility: negative experiences of doing a postdoc period abroad

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Empirical studies of negative effects or experiences of mobility are rare, if any. To better understand what research mobility is about, both positive and negative effects should be noted. This study attempts to analyse examples of less successful experiences in addition to the range of positive experiences that normally occur as the result of mobility. A sample of Swedish scholars who had earlier been on a postdoc stay abroad have answered a questionnaire that targeted experiences and effects from the postdoc stay. Some 10% to 20% faced negative effects as result of their postdoc stay abroad. Most often, these negative experiences related to the homecoming and the process of transferring their knowledge to the department or the research team upon their return. Routines for incorporating the new knowledge which they bring are sometimes weak, as is the interest from colleagues in what the postdoc scholar has learnt.

ISSUES RELATED TO MOBILITY of researchers have received significant attention the last years. This type of mobility is of interest to governing bodies of most kinds, be it at universities, funding organizations or at state level, because mobility of academics is believed to further scientific quality through both the exchange of ideas and the establishment of social contacts. Hence it is also of particular interest for policy-making and monitoring within the frame of the European Union (EU), broadly as a way of connecting scientists in the member states but also as a tool for strengthening scientific capacity in the light of the work with the European Research Area. The expansion of Marie Curie Scholarships in the 6th Framework Programme and the recent establishment of Mobility Centres in all EU member states are examples of the growing interest at EU-level. Others are paying attention to the issue of research mobility as well, through conferences or particular studies.

In most cases, research mobility is seen as something utterly positive and a phenomenon worth supporting. No doubt, the positive effects can make a long list. In brief, the positive effects concern spheres of improved scientific knowledge, widened communication surfaces and enhanced personal skills of a more tacit kind.

However, there is a side of mobility which is seldom spoken of, and likewise seldom studied. There are, in addition to the vast and obvious positive effects, also occasional negative effects of mobility of researchers. Some people have rather bad experiences from mobility and these experiences need to be taken into account together with the positive ones, in order to get an accurate and complete understanding of what mobility is about. This study attempts to

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contribute to the issue of research mobility with some results related to negative experiences of mobility for the individual, in turn leading to consequences on institutional level in the scientific system.

Indicator of research mobility

Research mobility is inadequately studied. In part this has to do with the difficulty of getting reliable quantitative data. Available national statistics are poor in many countries, and without the necessary range of variables for a comprehensive analysis, even though there might be figures of in- or outgoing scholars.¹ Student mobility is to some extent better investigated, but doing a literature search for 'research mobility' or related keywords, for instance in Web of Science (by Thomson Scientific Inc.), or a free search on the Internet, will not produce much.

Some, mainly positive, results of research mobility have been presented earlier (Melin, 2004). Those results originated in a study of Swedish scholars who went abroad on a postdoc stay of about one to two years. One finding was that the young researchers leaned on senior colleagues' networks and took their advice when they chose the host department of their postdoc stay. Through this, old networks and communication channels were passed on to a younger generation. Another finding was that the postdoc scholars had developed many scientific contacts during their stay abroad. A few years later, it could be seen that they had often collaborated with people they met during their postdoc stay, and in many of those cases the collaborative work included co-publication. Thus, the postdoc period abroad seemed to be an important component to their future development as successful scientists.

In that study as well as in the one at hand, the stay abroad as a postdoc scholar is seen as an indicator of research mobility. There are many other variants of research mobility beside postdoc trips abroad. Postdoc visits are, however, a very important instrument to accomplish the range of positive effects that are commonly referred to when speaking of mobility. In many European countries some 15% to 25% of an annual cohort of PhDs enter a postdoc period abroad (Abbott and Stiegler, 1996). For many, the postdoc stay abroad is the main mobility enterprise of their scientific life (Musselin, 2004). Therefore it is of interest to use postdoc visits as the object of study when looking at the negative effects as well. Clearly, this data cannot reveal any certain answers of how other forms of research mobility function.

There are lots of opinions about postdoc mobility in the literature. Editorials are frequent, as are published personal experiences from a stay somewhere, with tips and advice. Many of these contributions target working conditions of postdoc positions rather than the tradition of doing a postdoc period in another country. More thorough empirical studies are in either case sparse. Of the few, two examples come from the

field of professional psychology in the United States (Stewart *et al*, 2000; France and Wolf, 2000). In both cases surveys have been sent to a sample of young scholars with questions regarding their opinions about doing a postdoc period after they finished their PhD studies. France and Wolf (2000) report that the scholars expressed a relatively low degree of stress when it came to securing and obtaining the postdoc position, compared to what they reported regarding their earlier internship. This type of postdoc position is rather similar to an internship but on a more advanced level as it is required in order to obtain a psychology licensure (in most states in the USA). Except for the finding related to stress, we do not learn much about doing a postdoc period abroad or what other experiences there might have been.

Others have found such evidence though. Musselin (2004) describes many obstacles that postdocs from France, Germany and the UK face. Among the results, the postdocs see the period abroad as a risky phase. They are sometimes given very difficult tasks by the host department — 'missions impossible' — and the risk of failing with the work is thus high. They feel that support from the home institution is weak and the return is problematic. The contacts with the department of their origin often fade during the stay abroad. They try to survive by developing strategies to manage in the complex system of formal and informal connections and qualifications.

Recently, it has been argued that the mobility of postdocs between institutions in the USA to a large extent determines the status of the departments that send and hire postdocs (Burris, 2004). Status has commonly been seen as a result of scientific productivity but Burris presents results from sociology, history and political science where the mobility of postdocs explains the status level better. If this result holds for other disciplines as well, and for other countries, it indicates that the tradition to do a postdoc period may be a much more crucial factor for obtaining scientific excellence than has been understood — for the individual and for the institutions that are involved. Especially the institutional level seems to be somewhat overlooked when elaborating on the outcome of postdoc periods.

Clearly, there is an unfortunate gap of knowledge related to the tradition of doing a postdoc period abroad, not the least from a science policy perspective. Often mobility in general and postdoc stays as an indicator of mobility are seen as something positive and unproblematic. Here we turn the coin and ask if there are any systematic negative experiences and negative effects from postdoc visits abroad and, if so, which they are.

Method and data

It is very difficult to juxtapose possible positive and possible negative effects of a postdoc period abroad, although it would make the picture clearer. The

problem with such a framework is that research mobility, and thus a postdoc stay abroad, is expected to have positive outcomes. These normative expectations become problematic when we wish to investigate positive and negative effects empirically; if the positive effect is 'access to new knowledge', then the corresponding negative effect is 'low or no access to new knowledge'. Expressed negative effects from a postdoc stay ought to be more concrete than simply unfulfilled expectations. But use of quantifiable measures is problematic as well: is ten publications a success and five a failure? How are we to measure the large amount of talk about establishment of contacts and access to information via networks? Whether the effects are positive or negative often comes down to expectations and perceptions after all. This study presents results that often are related to 'soft data', such as expectations and perceptions, but attempts have been made to correlate them with a few main variables in order to create a picture that is reasonably solid and comparable to other, future results.

The original data is the same as used in an earlier study (Melin, 2004). The data has been further analysed in order to investigate questions concerning the negative effects of mobility, and results from a few interviews are also included in this study. Through archives and lists of former grantees at six main Swedish grant-giving organizations, 773 postdoc scholars were found. There are other organizations in Sweden that award postdoc scholarships, but not all were inclined to participate in the study; some did not still have the relevant information. The data mainly refers to postdoc stays carried out during the 1990s, but in some cases there is information about scholars from the 1980s as well. As we are interested in the effects and the postdocs need to have been back for a while, the time period was set to end after 1999. A few years normally have to pass in order to see any effects.

Addresses of the former postdocs were sought on the Internet. For 460 individuals, the present address could be located. A questionnaire was sent to this sample and 284 valid questionnaire forms were returned, a response rate of 65%. Of these, 30% are women and 70% are men. The average age at the time of their PhD graduation was 33 for the women and 32 for the men. The postdoc period had normally started the year after the graduation and on average lasted for 17 months for the women, compared to 20 months for the men. The sample is fairly representative of the Swedish population of PhD graduates from the period at hand, with respect to gender balance and main scientific areas (humanities and social sciences; medicine; natural sciences; technology). There is an over-representation of individuals from natural sciences and an under-representation of individuals from technology, compared to the outtake of PhD degrees in Sweden. Otherwise there is at most a few percentage points of difference between the sample and the national

figures. Hence, if there are any results where natural sciences or technology differ from the rest, these results will be less valid than if our sample had had a better match. More details and exact figures are presented in the previous study and will not be repeated here. There it is furthermore stated that

The sample is a Swedish one, but most of the results are likely to be valid for other countries with a similar tradition of doing postdoc abroad as well. Particularly countries in Scandinavia and Western Europe are comparable to Sweden in this respect, where some 15% to 25% of an annual PhD cohort go abroad for a postdoc period. (Melin, 2004:97)

This argument is likely to hold for this study as well. Still, the fairly low number of respondents, especially when figures are divided by break variables, enforces a cautious interpretation of the results. Therefore conclusions and comments do rarely refer to exact percentages; this would indicate a higher level of accuracy than is appropriate. Normally percentage shares are rounded off through the text. The questionnaire responses are analysed by a statistical software program and relevant correlations or deviations are commented on. As a rule, the results from such a limited sample and the exploratory type of questions used can at best indicate systematic circumstances, but not reveal certain and general conditions. The study should be seen as a starting point.

Out of the 284 individuals who returned the questionnaire, 15 were chosen for a telephone interview. No regard was paid to the answers they had given in the questionnaire. The interview group was chosen from the cohorts of the early 1990s, with the purpose of getting individuals who had been back from the postdoc stay for a number of years, often a decade. A balance between gender, university affiliation and disciplinary background was also sought. The interviews were semi-standardized; each interview contained about ten questions which could be extended or followed up with other questions, depending on how the informant responded. The interviews were not made for any statistical reasons. They serve the purpose of deepening the understanding of figures and correlations, revealed through the questionnaire

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or coming from other sources. Circumstances which are mentioned in the questionnaire may be exemplified or put into context through the descriptions and explanations given in the interviews.

Both the questionnaire and the interviews were written and done in Swedish. The responses are thus in Swedish as well. For publication of the results in English, the author has translated questions, comments and quotations from Swedish. Efforts have been made to keep the translations as close to the original as possible. When comments originate from a certain questionnaire form, a code number is provided so that it is possible to trace the very form where the comment is originally given.

Results

To begin with, it is interesting broadly try to understand what effects a postdoc stay abroad might have and if there are any less positive signs to pick up. To get an indication about this, the former postdoc scholars were faced with a range of statements with which they had to grade their level of agreement. The range of statements attempts to cover many of the positive effects that are commonly referred to. It was possible to grade each statement from 1 to 5, where '1' means 'do not agree at all', and where '5' means 'fully agree'. The statements are presented in Table 1.

Generally, the former postdoc scholars showed a high level of agreement with the statements in Table 1. The only alternatives that got lower grades were 'e' and 'f'. While 'f' may be rather a particular type of statement, with which a low level of agreement is

nothing noteworthy, the slightly lower average level of agreement with 'e' is worth one comment: it is the one statement which most clearly refers not only to the outcome of the stay in itself but connects this to what happened after the postdoc was finished. The postdoc stay may have increased the knowledge, it may have widened the contact network or given tacit knowledge and maturity as a researcher, but contacts made and knowledge gained were on the average less crucial for continued research.

Nuances are small and there are no differences between men and women for any of the alternatives. However, there are some differences when looking at disciplinary background, aggregated to main scientific areas.

For instance, when looking at alternative 'h' (I think that I have been visiting an internationally top-qualified environment), there is a difference between humanities and social sciences, versus the other main scientific areas. About every second person from medicine, natural sciences and technology responded that they fully agreed with the statement. For humanities and social sciences, the level of agreement was significantly lower: 30% agreed fully with the statement.

Have the researchers from humanities and social sciences been staying at less prominent institutions? Or is it a difference in perspective, where it is less important to do a postdoc period at a top-ranked institution than it is within the 'hard sciences'? It may also be that there is less consensus regarding what counts as a top institution among humanities and social sciences, than in the other main scientific areas. It was not possible to calculate which university is the best of those that the researchers had visited, neither were attempts made to use any of the ranking lists that are repeatedly published, and thereby benchmark each university status-wise. The only method I found plausible was to read through the set of host universities and compare the counts.

No obvious differences were found between researchers from humanities and social sciences, and the others. People had been staying at the same well-known and prestigious universities regardless of their scientific background. Sometimes people had been to less renowned universities, but no disciplinary differences could be found. In contrast, when data was aggregated on country-level, there were some differences. The relative share of United States as host nation was lower for people from humanities and social sciences. Between 50% and 60% of those from medicine, natural sciences and technology chose the USA for their postdoc stay, while 30% of the humanitarians and social scientists did so. Their travelling pattern was instead more widespread than the others' and more countries were represented. Whether the reason to this difference is related to separated disciplinary traditions where different motives to do a postdoc period are at play, or if the questions of study differ in such a way that a wider geographical travelling pattern is motivated in

Table 1. Effects of postdoc stays: 'A postdoc stay can have several effects for the one going. Grade your level of agreement between 1 and 5 with the statements below. 1 = do not agree at all, 5 = fully agree'

	Statement	Average degree of agreement
a.	My postdoc stay increased my knowledge significantly	4.3
b.	My postdoc stay resulted in significantly widened contacts	3.8
c.	I encountered new questions of study during my postdoc stay	3.9
d.	The main benefit of my postdoc stay was that I became a more mature researcher	3.8
e.	The contacts I developed and the things I learnt during my postdoc stay have been crucial for my continued research	3.1
f.	It was a period of recovery and nice experiences, like a sabbatical period	2.5
g.	I gained much 'tacit knowledge' like increased cultural or social competence, and international understanding	3.6
h.	I think that I have been visiting an internationally top-qualified environment	4.1

humanities and social sciences, it is not possible to investigate further here.

Given the slightly weaker level of agreement in statement 'e' in Table 1 (The contacts I developed and the things I learnt during my postdoc stay have been crucial for my continued research), it is of interest to investigate to what extent the postdoc scholars were able to pass on scientific accomplishments and personal experiences to the home department upon their return. Could knowledge and contacts be of benefit to colleagues? The question is relevant because it targets the relation between the postdoc grantee and the department where subsequent work is taking place. There are effects for the individual and for the department or the research team from a postdoc period abroad. The interplay between the individual and institutional levels is in many cases a key to successful or unsuccessful outcomes of a postdoc stay. The effects for the individual are relatively easy to describe, but what the effects are for the team or the department are probably less clear. The former postdocs' own perception of how far the home environment was interested in the knowledge and experiences that the postdoc scholar brought back is an indicator of how well the knowledge transfer worked.

Again, the postdocs were given a set of statements and were asked to grade those in the same way as in the previously presented question, from 1 to 5. The statements are shown in Table 2.

A majority, about 60%, agreed (grade 4 and 5) with the first statement, that the postdoc stay had proven to be a valuable merit. This result is hardly unexpected. It is on the other hand of interest that one out of five did not agree (grade 1 and 2). Women tended to place themselves more on the extreme ends, fully agreeing or not agreeing at all, while men more often chose the middle level of agreement.

An obvious indicator of whether the postdoc stay had been a valuable merit would be if it had contributed to getting the job that the researcher took up after returning to Sweden. However, the result here is dubious: about 40% agreed but at the same time a similar proportion did not agree. No differences could be seen between men and women. The correlation between this statement and alternative 'a' is strong: of the 58 individuals who did not agree that their postdoc stay had proven to be a valuable merit, 46 also did not agree that it had contributed when they got the following job. The respondents were proportionally distributed over the main scientific areas. Possibly, whether one gets a permanent (or anyway stable) position upon return may be a key variable; those who did may feel that the postdoc stay had positive effects and those who did not may be disappointed. This is, however, a task for future studies to investigate.

Can it even be a negative merit to have done a postdoc period, so that one is less competitive after the postdoc stay than one would have been otherwise?

Table 2. Effects of postdoc stays. 'How do you think that your achieved knowledge and your experiences from your postdoc stay have been estimated and incorporated after your return to Sweden? Grade your level of agreement between 1 and 5 with the statements below. 1 = do not agree at all, 5 = fully agree'

	Statement	Average degree of agreement
a.	My postdoc stay has proven to be a valuable merit	3.7
b.	The fact that I had been on a postdoc stay contributed to the employment I got upon my return	3.0
c.	I have in various ways passed on my knowledge/experiences from my postdoc stay abroad to others at my workplace after I returned	3.7
d.	I have shared my knowledge/experiences with others but my employer has not been interested in supporting this	2.9
e.	It became evident that going on a postdoc stay partly discredited me, for instance because I had not qualified myself at the department	1.9
f.	My postdoc stay has not had any effects for the department/team to be mentioned, but rather for myself	2.9
g.	My employer values the knowledge I have but has not been interested in the experiences from the postdoc stay	2.9
h.	My postdoc stay has had indirect effects on the department/team through certain knowledge and contacts that with time have come to influence the research	3.4

To test this assumption, the former postdocs were asked to grade the statement 'e' (It became evident that going on a postdoc stay partly discredited me, for instance because I had not qualified myself at the department). A strong majority did not agree with this, about 70%. However, 17% responded with agreement (grade 4 and 5), men as often as women and without other than marginal differences between the main scientific areas. It is rather striking that about one postdoc scholar in six thinks that the postdoc period abroad has been a negative merit for them. It was possible to give free comments in the questionnaire and many of those who did so touched upon this matter in their notes. The negative effects were often described in terms of lower salary, and that it takes time to start up research when going abroad and again when returning home; thereby time is lost and one misses out in respect of publication.

On the whole, the postdoc stay resulted in an increased merit value, despite change of orientation, but the main disadvantage was that I missed two occasions of wage negotiations and that the competence raise didn't pay off economically. (Q80)

The Karolinska Institute says that a postdoc stay is a merit but the fact is that you lose publications and it does not pay off when negotiating about your salary. (Q419)

If we look at alternative 'c' in Table 2 (I have in various ways passed on my knowledge/experiences from my postdoc stay abroad to others at my workplace after I returned), only very few did not agree with this. In alternative 'd' the statement is slightly sharpened (I have myself shared my knowledge/experiences to others but my employer has not been interested in supporting this). About one third did agree and about one third did not agree. Alternative 'g' attempts to test the matter further (My employer values the knowledge I have but has not been interested in the experiences from the postdoc stay). About one fifth did not agree at all and among those, no gender differences were found.

Regarding the other approximately 80% who in varying degree agreed with the statement, women were more inclined to respond with a 'fully agree' than men. The two highest grades, 4 and 5, are given by 30% of the men and 40% of the women. For this alternative, or statement, there is a tendency that women are somewhat more disappointed than men. Possibly, this could be an indication of women's weaker integration in the departmental environment.

It is not certain that a postdoc stay needs to have direct and clearly visible effects on the home environment, nor is it certain that knowledge transfer does not work just because there are no such obvious effects. There can be other and more indirect effects, difficult to measure, but yet of great value to the scientific development at the home department or research team. Alternative 'h' is an attempt to test this idea (My postdoc stay has had indirect effects on the department/team through certain knowledge and contacts that with time have come to influence the research). The responses were scattered over the scale but tended to go towards agreement rather than the opposite.

However, there is an overall 10% gap between men and women: 6% of the men did not at all agree while the corresponding figure for women was 17%; at the same time 23% of the men fully agreed while only 17% of the women did so. The gap can also be measured as the mean of the grades: 3.2 for women and 3.5 for men. The interpretation of these results is that there is a general agreement with the statement but that the level of agreement is somewhat weaker among women. As was also indicated above, women seem to perceive that their knowledge transfer has been less successful than men think their own has been.

Yet another statement touches on this matter: 'f' (My postdoc stay has not had any effects for the department/team to be mentioned, but rather for myself). Again the responses were scattered over the scale, and again there is a gap between men and women of about 10%, where women tended to agree

to a higher extent than men. As many as 24% of the women agreed fully with the statement while the corresponding figure for men was 10%. This can be interpreted as further support for the suspicion that women are facing more problems of knowledge transfer when returning to their home department after a postdoc stay.

If we look at the eight statements in Table 2 collectively, to begin with, we can note that the responses are fairly scattered over the scale; rarely is there a clear tendency towards agreement or no agreement with any of the statements, neither are the grades gathered in the middle. This means that there was a large proportion of the former postdocs who agreed while at the same time there was a large proportion who did not agree. This result is of interest as it indicates that parts of the group have quite different perceptions of how the postdoc experiences have been valued and incorporated in the research work when they came home, than others have. One group is quite disappointed (as it seems); one in five think that the postdoc stay was not valuable, one in six even think they lost in terms of qualification by going on a postdoc period, about one third think that the home department did not show an interest in the experiences from the postdoc stay and, finally, about one in six female scholars could not see that the postdoc stay had even indirect effects on the department/team, which is just a slight difference from what men thought.

Taken together, there is an overall tendency that the female postdocs perceived the process of bringing knowledge and experiences back into the home department as less successful than men did. Yet, at the same time there is a large group who appear to think that this all worked fine and that there has been a fruitful knowledge transfer from the postdoc period. Things seem to work differently at different places.

The disappointed group is, however, not one and the same for the set of statements above; it is not the same set of individuals who have given 'negative' responses to all questions. Hence it is not possible to identify that group and investigate the circumstances for them further.

It may be noted that an evaluation by the Swedish Council for Natural Sciences (NFR) from 1995 showed similar results. This organization was the first one to give postdoc scholarships for visits abroad in Sweden, and was the main supplier of such scholarships for many years, (until 1996 when the Swedish Foundation for International Cooperation in Research and Higher Education, STINT, became the main supplier). The evaluation covered all who had been granted between 1981 and 1991. Several questions were asked of the extent to which the orientation at the department had been affected by the postdoc stay, and whether new methods/techniques had been presented and incorporated in the work. Depending on which question, there was a group of some 10% to 25% who said that the

postdoc stay had no such effects on the home department (NFR, 1995).

Further comments from the questionnaires are of interest. Many of them encircle the idea that the scholar missed out in terms of formal qualification although the stay in all other aspects was very rewarding.

By going on a postdoc period you 'lose speed' in the research, i.e. it often takes some time before you have enough data for publication and since the number of publications is the main measure when approving grants, you can lose by going. (Q19)

Unfortunately my postdoc stay (at Harvard, at a group where the group leader got the 'Small Nobel Prize') has not at all been seen as a merit when applying to research councils. (Q24)

I thought that the postdoc stay and the publications from it would have been more qualifying. I tried to start up a new research line with my knowledge from the postdoc period, but got no support for this from the department or from external sources. (Q169)

The last quotation above indicates dissatisfaction with the department. This relates to the problems with knowledge transfer that have been mentioned. The attitude at the home department and the will to incorporate the 'new' knowledge into the ongoing research at the department is commented on by a few respondents:

Circumstances at home during my postdoc period caused the professor whose support I had to quit and move abroad to another position. I was not welcomed by the staff who remained at the department, which meant that I don't work in a research-related environment at present. (Q430)

Unfortunately I became aware upon my return that I had been given a travel grant with the purpose of my disappearing from the department and allowing for other more renowned researchers to take my place ... I can summarize my situation after returning as pure hell. I had to go into therapy and take antidepressive medication for years afterwards. But from a scientific point of view and for my competence and personal development, my postdoc stay has been absolutely crucial. (Q242)

Other comments with concrete examples exist. The comments illustrate some of the circumstances indicated by the questionnaire data. The share of unsatisfied postdoc scholars is large enough for academic leaders and directors to start thinking about how postdoc experiences are used. Perhaps organizations

which provide postdoc scholarships should also consider this; it is their money that is invested in the visits in order to gain knowledge.

Answers given in the interviews point in the same direction as many of the comments from the questionnaires. Several interviewees say that it is more difficult for women to do a postdoc period abroad than it is for men. One man with a background in genetics says that in his research group, almost all men went on a postdoc period but only one woman, and he thinks the explanation is their age, just over 30. 'Rather family than a postdoc stay', he says they think. The quantitative and qualitative data go hand in hand in this respect. If it had been possible to include all those who never applied for a postdoc grant for gender- and family-related reasons, the differences between men and women would naturally have been even more emphasized. This sample contains women who did go.

Conclusions and discussion

In most cases, a postdoc period abroad is something most rewarding both from a knowledge-related point of view and when it comes to development of international scientific contacts and access to academic networks. It furthermore has 'soft' or tacit values, such as increased understanding of foreign ways and habits, for instance. There are, however, cases where a postdoc stay abroad does not have such positive effects. That this happens once in a while is natural, but it is interesting if there are any patterns among less successful or failed postdoc endeavours.

It can be concluded that there seem to exist systematic negative sides of postdoc visits abroad. These negative sides relate most often to the process of homecoming and the culture at the department. It is unusual that the perceived negative experiences relate to the stay in itself, to the host department or the situation as a postdoc abroad. It is the return, the knowledge transfer back to the home department (or lack of it) and failed expectations regarding merit evaluation of the postdoc stay from grant-giving organizations and the employer, which cause the feeling of disappointment for the individual. Some 10% to 20% of the former postdoc scholars experience

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negative effects upon their return, depending on which type and degree we speak of.

Women tend to be slightly more disadvantaged than men when returning after the postdoc period abroad. They express a slightly higher degree of dissatisfaction with the knowledge transfer and the interest from the employer and the department regarding their postdoc experiences. The gender difference should not be over-emphasized though; the sample is small and interpretations must be made with caution. Still, it is hardly controversial to assume that, as many academic workplaces and scientific networks are male-dominated, women may face obstacles of exclusion that many men do not. It may be more difficult for a woman to establish herself again at the department after a substantial period abroad and get acceptance for new ideas and new lines of research. She may be less well rooted in the collegial environment than a man in the same situation would be.

These effects refer to individuals who complete a postdoc period. Failed personal endeavours of this kind and scale are of course critical for continued individual scientific achievements. This is reason enough to investigate the negative sides of research mobility further. In addition, there are effects on an institutional level. From a policy perspective, a focus on the institutional level might be even more interesting. The host department benefits from the knowledge and the foreign perspectives that the young postdocs bring with them, along with the very work that they carry out while being guests there. When the postdocs return, either to the same department which they left or to another department where they take up a position, there are potential effects for that 'home' department (or the research group, if this is applicable). In order for the knowledge transfer to take place successfully, there needs to be an interest in what the returning postdoc has learnt during the stay abroad, and there need to be an openness to incorporate the new knowledge, the methods or techniques, into the everyday research practice at the home department.

The postdocs are carriers of new knowledge and agents in social networks. The transfer of knowledge to colleagues leads to creation of new knowledge. This takes place both when they come to the host institution of their postdoc stay and when they return, wherever this is. The importance of such interaction within research teams is investigated by Guan and Wang (2003). They distinguish some teams in a sample which are more efficient than others, and propose three indicators that can explain the difference: ability to attract and select qualified staff with social qualities and cooperative spirit; use of functional communication technologies such as powerful Internet and Intranet resources; creation of an open and pleasant environment that encourages new ideas and with tolerance towards mistakes (Guan and Wang, 2003:148–150). For instance, they present examples at departments and teams of arrangements

made in order to facilitate the transferring process and create a 'good' environment where communication flows easily.

'Scientific Team for Youth' are typical forms facilitating ideas' exchanges. Furthermore, to encourage the informal communication among researchers, the coffee room, which is called 'the home for scientists', was founded last year. It is a free place to discuss the scientific issues and more than 500 people have visited it since then. (Guan and Wang, 2003:147)

The quotation above exemplifies the importance of paying attention to the culture at the department/team. When the local culture does not support the exchange of ideas, the otherwise promising effects from a postdoc might be spoiled. Guan and Wang also note that many of the more efficient teams in their study have recruited foreign scholars.

The social culture within the department or team is further investigated by Hara *et al* (2003). Through an in-depth study of four teams, some major factors that impact collaboration behaviour are described. Several examples of the complicated social relations and their effects on the research work are given, with particular emphasis on collaboration. It is concluded that

Integrative collaboration relies on the coincidence of people making personal connections. If these connections do not initially exist, it is possible that they will develop, but this may take time as well as infrastructure that promotes awareness of research capacities (e.g. video conferences, faculty meetings) and facilitates broad, or unlimited access to colleagues. (Hara *et al*, 2003:964)

Relatively big sums of money are invested in postdoc scholarships and if there are only individual effects and few institutional effects, the question must be raised of whether the money could bring about more valuable effects if invested in some other way. The postdoc scholarships we are dealing with in this study are normally in the range of €20,000 to €40,000 *per annum*. Swedish organizations usually follow the scholarship rates of the European Molecular Biology Organization (EMBO; rates are published on the EMBO website). If the outcome of this money could be improved by certain actions and rearrangements, this might be beneficial not only for the individual but for the system as well.

It may be argued that a certain failure rate is normal and unavoidable, for postdoc stays as well as for most other activities. Such an argument is indeed valid, but the point here is that the negative effects are systematic and not random; they are systematically connected to the process of returning after the stay abroad. Being systematic indicates a potential for further analysis and improvement. Even a 10%

failure rate in establishing oneself as a researcher after returning from a postdoc stay abroad, due to a non-supportive culture, is a costly figure from a national perspective.

In 2004, the Swedish Research Council awarded 45 postdoc scholarships in medicine, natural science and technology, to a cost of about €1.5 million. These scholarships are not awarded as a proof of appreciation for good work done so far, but with the purpose of strengthening the science base for the future. The most promising applicants with best potential get the scholarships. If 10% or so of this category of young and promising scientists fail after the return from the postdoc stay, not because of scientifically disqualifying reasons but due to non-functional routines of landing the postdoc in the home departmental milieu, this has a relatively high price and should be a matter of concern to governing bodies through the academic system. Not all who have negative experiences fail to become researchers but if one in six thinks that the postdoc stay was of negative merit, as the results indicate, then that investment was anyway a failure; and if one in five think that the home department did not bother about their knowledge or foreign experiences, then there must be poor institutional effects from those postdoc scholarships.

The domestic universities and departments should find ways better to incorporate the knowledge that the returning postdocs bring with them and try to make better use of the contacts that they have established. There has been too much focus on the individual effects of doing a postdoc period abroad and too little attention has been paid to the institutional level. A better balance would be beneficial. There is good potential for a more efficient knowledge transfer if the routines for doing this are developed and the attitudes towards returning young researchers changed in some places. A consequence of such an improvement would almost certainly be higher scientific quality and a more efficient use of the money.

There are some dark sides of mobility. They are not severe, but they seem to exist, here empirically shown regarding a sample of postdocs who have been abroad, and often related to the process of homecoming. These dark sides must be seen in the context of the positive outcomes of mobility. The

full range of different experiences and effects help create a more comprehensive picture of research mobility, thus contributing to a more thorough understanding of the complex set of factors at play.

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Note

1. The European Commission has taken an initiative to map what data on research mobility there is in a number of EU member states: 'Human Resources in Research and Development: Monitoring System on Career Paths and Mobility Flows', directed by the Institute for Prospective and Technological Studies (IPTS) in Seville, Spain; ongoing during 2005.

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