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## Personal Social Networks and the Cultivation of Expertise in Magic: An Interview Study

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**Abstract** The purpose of the present study was to examine expertise in magic by interviewing 16 prominent Finnish magicians who were identified earlier through a social network analysis of 120 Finnish magicians. A semi-structured interview was administered that addressed the participants' histories; their relationship to magic, the nature of their expertise, the networked development of expertise, their engagement with magical expertise and their motivation for cultivating such expertise. The results indicated that expertise in magic is cultivated, to a great extent, by informal networks of expertise without formal training. The participants had become excited about magic as children and started to pursue an expertise in the field from a relatively early age (4 to 14 years). In accordance with other domains of expertise, it had taken about 10 years of cultivating skills and competencies before becoming professional in the field, with a few exceptions. Ego-centric network analyses revealed that there were three or four magicians who had significantly shaped the Finnish field of magic and affected most of the participants' development and career. Most of the participants were clustered, forming a core of Finnish magicians, and those magicians working abroad and collaborating with international magicians were located at the periphery of the Finnish network or formed an isolated network of clusters within it.

**Keywords** Expertise . Expertise in magic . Networked expertise . 10-year rule

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## Introduction

Conjuring is one of the oldest forms of art known to mankind, and this form of magic has been used both for entertainment and for spiritual purposes. Today, magicians form a relatively small group of entertainers who have specialised in this art of deception. The purpose of the present interview study was to examine exceptionally highly regarded Finnish magicians' personal accounts of the trajectory of the development of skills and competencies required to successfully pursue this activity professionally. We will start by reviewing the research literature relevant for examining expertise in magic, which includes: research on exceptional competencies in arts and sports, and conjuring; the role of deception and the training of motoric skills required to reach magical competence; the cumulative deliberate practices involved in becoming a professional magician; social sharing of knowledge and competence among this rather loose community of magicians.

Expertise refers to an outstanding capacity by the individual to solve problems in his/her own field based on exceptionally well-organised and usable domain knowledge and the ability to perform actions according to very high standards of performance (Chi 2006; Ericsson and Lehmann 1996; Ericsson et al. 2009). Expertise has been thoroughly investigated in science, sport and the arts (Ericsson 1996; Faulkner et al. 1998; Ericsson and Starkes 1996). Professional magicians invest vast amounts of time and resources in developing their skills. Moreover, combined with the exceptionally high level of competence required to perform magic professionally, justifies classifying this group of conjuror as experts in magic. The culture in which conjuring skills are developed is intriguing because the process of becoming professional in this field takes place in an informal manner, without organised training and education. Yet, it appears that cultivation of exceptional competence in the field of magic requires systematic training across years, which is comparable to other domains of expertise.

The field of magic involves the development of professional methods and techniques for deliberate human deception. Highly regarded magical performances rely on a sophisticated understanding of human cognition, especially thinking and perception (Kuhn et al. 2008). The audience experiences amazement while observing magic performances because they are unaware of the methods that produce the magical effect. Similar to scientific researchers, serious magicians have a theory about how to deceive the audience. This informal "theory of deception" is tested through successive performances and continuously updated and improved through feedback from repeated performances (Kuhn et al. 2008). Whilst some basic magic tricks may involve relatively simple forms of trickery, experts usually employ complex and often multilayered forms of deception. Magic involves expertise in a wide range of domains including motor skills in the form of sleight of hand (Cavina-Pratesi et al. 2011) or decoupling of the audience's gaze and the magician's action,

purposefully misdirecting attention and manipulating people's expectations. Hence, magic may be seen as a combination of diverse, but integrated, skills and complex competencies that rely on appropriate tools and instruments. In recent years, there has been much interest in exploring magicians' real-world expertise in deception to further our understanding of human cognition (Kuhn et al. 2008) and neuroscience (Macknik et al. 2008). Although it is generally agreed that this expertise has much cultural and scientific value, very little is known about how this expertise is acquired.

The development of expertise involves the so-called 10-year rule, which proposes that expertise requires approximately 4 h of deliberate practice, i.e., practice aimed at improving one's performance, per day across 10 years (Ericsson et al. 1993; Ericsson and Lehmann 1996; Ericsson 2009). Maximisation of deliberate practice is neither short-lived nor simple. It involves optimisation within several constraints. First, deliberate practice requires available time and energy for the individual, as well as access to teachers, training materials and training facilities (resource constraints). Second, engagement in deliberate practice is not inherently motivating. Performers consider it instrumental to achieving further improvements in their performance (motivational constraint). The lack of inherent reward or enjoyment in practice, as distinct from the enjoyment of the result (improvement), is consistent with the fact that individuals in a domain rarely initiate practice spontaneously. Finally, deliberate practice is an effortful activity that can be sustained only for a limited time each day during extended periods without leading to exhaustion (effort constraint). To maximise gains from long-term practice, individuals must avoid exhaustion and must limit practice to an amount from which they can completely recover on a daily or weekly basis (Ericsson et al. 1993).

Deliberate practice is not a question of mechanical repetition: it is about selectively developing skills to overcome weaknesses, creatively refining different aspects of the performance and reflecting on and conceptualising skills developed under the tutelage of a previous mentor to improve the performance (Gruber et al. 2008). At the same time, integration into professional networks takes place (Rupprecht et al. 2010; Gruber et al. 2008). In interest-driven activities, personal interests tend to be interwoven with common interests, as part of the wider community (Laginder and Stenøien 2011).

Experience does not always lead to a high level of skill: many experienced practitioners become routine experts, i.e., experienced non experts (Bereiter and Scardamalia 1993; Hatano and Inagaki 1992; Hakkarainen et al. 2004). Achieving a top level of skill requires the individual to enter into difficult situations and to systematically practice at the upper echelons of one's proximal development rather than remaining in one's comfort zone. For example, in the domain of magic, maintaining a high degree of knowledge in the field requires experts to update their knowledge and to develop new tricks and entertainment programs. According to research in expertise, it appears that the intensity of deliberate practice is a reasonable and simple explanation for achieving an exceptional level of accomplishment in a field (Ericsson and Lehmann 1996). Keeping up a high level of performance requires a practitioner of magic to repeatedly expand and refine new competencies. Thus, his

or her actions in a new performance may initially resemble those of a novice. Continuous audience feedback and personal and collaborative post-performance reflection on conjuring are integral forces that drive development.

While magicians' exceptional competencies appear mysterious and difficult to understand to outsiders, they are able to capitalise on their socio-culturally evolved collective expertise or skill culture (Hakkarainen et al. 2004). Expertise in magic is upheld by a network of magicians, who have a plethora of activities including conferences and workshops, as well as online magic forums. Accordingly, expertise in magic can be considered as playing a role in a social community rather than merely being an individual characteristic (Stein 1997; Mieg 2001; Palonen et al. 2004). It involves sharing knowledge that is developed by interacting with other magicians. In group creativity, innovations emerge from the collective actions of many individuals working together (Sawyer 2012). Mastery of magic is not possible merely through academic endeavours, such as reading magic books: it requires contact with mentors and the gradual transmission of skills and competencies through apprenticeships (Gruber et al. 2008). The learning journey (from novice to expert) that underpins the apprenticeship is followed by many vocational groups such as surgeons, musicians, journalists and lawyers, as well as by hairdressers, plumbers and chefs (Fuller and Unwin 2010). Within the magic community, displays of commitment to sustained deliberate practice will gradually open up doors to guarded tricks of the magical trade.

The present study focuses on analysing trajectories of the development of expertise of individuals who were selected for interviews on the basis of nominations by their peers as representing the most respected magicians in their field. We examined how a person grows into a highly regarded professional magician. Issues of interest were, amongst others, the developmental phases of expertise in magic, the gradual appearance of expertise in learning skills and competencies and participants' reflections on their developmental processes, as well as characteristics of the interaction, coconfiguration and collaboration of magicians (Frank 1996; Hakkarainen et al. 2004; Wasserman and Faust 1994).

Specifically, the present investigation aimed to answer the following research questions:

1. How does someone become a professional magician, and what is the developmental trajectory of a conjuror?
2. What kinds of deliberate practice do magicians take part in? What kinds of experiences make participants engage in cultivating expertise in magic?
3. What kind of social networks do expert magicians have? What do the master teachers focus on in terms of specific factors and activities? What are the characteristics of the collaborations?

## Method

Retrospective semi-structured face-to-face interviews and tools developed by social network analysis were integrated to analyse the role of personal characteristics and

variables regarding the social context in the development of expertise. Retrospective analyses assist in tracing long-term trajectories of the development of expertise. Many recent expertise studies have questioned experts (e.g., musicians) about their daily or weekly practice, the level of practice, the time spent practicing on one's own, the time spent practicing with others, and so on. These studies have shown that the above variables correlate with the experts' performance (Cote et al. 2005; Ericsson and Lehmann 1996), indicating, e.g., that the duration of practice, as well as the structure of different forms of training, varies along developmental phases during the expert's career. To distinguish the most important steps in the trajectories of developing expertise and the social aspect of this development, we traced the social context of this expertise, i.e., important supporters and teachers within certain periods in the magicians' lives. In the interviews in the present study, the name-generator technique was employed, and egocentric network analyses were undertaken (Marsden 2002; Wasserman and Faust 1994).

The personal network study approach is appropriate for the analysis of exceptional competence because it links the social context to the individual's capacity by indicating how people create, maintain, cultivate and activate their personal social networks (Palonen 2006). Experts nurture and profile their own expertise by reactivating and strengthening relevant links, depending on what kind of work they are doing (Nardi et al. 2000). Egocentric networks indicate what type of people ('alteri') a subject ('ego') knows and shed light on the richness of the resource, i.e., the 'quality' of the ego network. Participants

A group of the most esteemed professional Finnish magicians (N=16) were selected to be interviewed. Only two of them were females. The participants were selected because they had been nominated by 120 Finnish magicians as the most highly regarded Finnish magicians by their peers (Rissanen et al. 2010). To protect the anonymity of the participants, some of the information regarding the participants has been changed in the present report.

### Methods of Semi-structured Interviews

Semi-structured interviews were administered that addressed 1) the participants' history and orientation towards magic, 2) the nature of their expertise, 3) social networking relations relevant for the development of expertise and 4) engagement in magical expertise and motivation for cultivating such expertise. The interviews focused on a range of variables from the participants' first contact with magic, the development of their professional profiles and their accumulation of knowledge and expertise to their creation of new tricks and performances critical for advancement in the tradition of magic. The interviews took from 57 min to 3 h and 37 min, depending of the length of the individual's career and the articulacy of the interviewee. The interviews were transcribed and analysed qualitatively using the ATLAS.TI 6.2 program. We analysed the data several times so that at first the important notions were identified and organised according to the order how the

questions were stated during the interview. Next, the findings were re-organised based on the research questions. Researchers worked independently in the first phase but later the results were jointly discussed. The quotations were selected in researchers' meetings to describe the findings by using respondents' own words. While the analysis was shaped by expert study theories and approaches, the specific nature of the data collected guided the resulting qualitative analysis. The following principal themes of the interviews structured the qualitative analysis of the data: 1) trajectory of developing expertise in magic, 2) pursuit of developing expertise in magic (deliberate practice), 3) profile as a magician and relation to the audience and 4) evolution of magical culture in Finland.

### Ego-centric Network Analysis

An important aspect of the interviews was to collect data regarding their ego-centric networks related to magic (Palonen 2006). In egocentric methods, the most common technique used to list network members is the name generator, which consists of free recall questions that facilitate alters to form an ego's network. According to Marsden (2005), name-generating questions elicit only a fraction of respondents' social contacts. However, the advantages of this approach include the identification of specific content areas and the mapping of ego-network locations and characteristics, as well as social resources, embedded in the ego-network. The disadvantages include a bias towards the inclusion of stronger ties (Lin 1999).

Participants were asked to draw a picture (e.g., a timeline or a map) regarding the development of their expertise and write down names of important people around the picture, and then highlight issues and events relevant to the development of their expertise. The networking partners mentioned were classified according to the following five categories: 1) people who were significant regarding their career as magicians, 2) people from whom they have received guidance (i.e., mentors), 3) partners in collaboration, 4) international contacts and 5) individuals whom the interviewees had supported and guided. The Cytoscape program was used to visualize the ego-centric networks. It is an open source software platform for visualising complex networks and integrating these with all types of attribute data. For instance, various plug-ins allow social network analysis to be undertaken.

### Results

The results section is organised as follows. Firstly, we examine the participants' life histories or careers that led to them becoming professional magicians. Secondly, we address how they reported cultivating expertise in magic through deliberate practice. Thirdly, we analyse participants' personal social networks that facilitate and support cultivation of their expertise. Finally, the evolution of Finnish culture of magical activity is shortly discussed.

Through What Kinds of Trajectories Did the Participants Become Professional Magicians?

In the interviews, participants were asked to reflect on their trajectories of growing up to become professional magicians. Based on their accounts, we subdivided their careers into four stages (Fig. 1). Stage 1 represents the time between their birth and the first contact with magic culture; stage 2 refers to the time period between the first contact and the beginning of a real and serious interest; stage 3 involves the time invested in pursuing deliberate practice; stage 4 is the period spent working as a professional magician (to the present). Our results indicated that participants had worked as professional magicians for between 12 and 41 years ( $M=22.3, SD=9.8$ ). On average, participants had their first contact and experience with magic around the age of 7 years ( $M=6.6, SD=2.5$ ). Three-quarters of the participants (12/16) encountered magic when they were younger than 7 years. Excluding M2, M13 and M16, most of the participants started practicing their skills seriously around the age of 10 years, i.e., moved to the second stage of their trajectories of becoming magicians. This is in accordance with expert research indicating that international-level performers often receive their first exposure to their domain between the ages of 3 and 8 years (Ericsson et al. 1993).

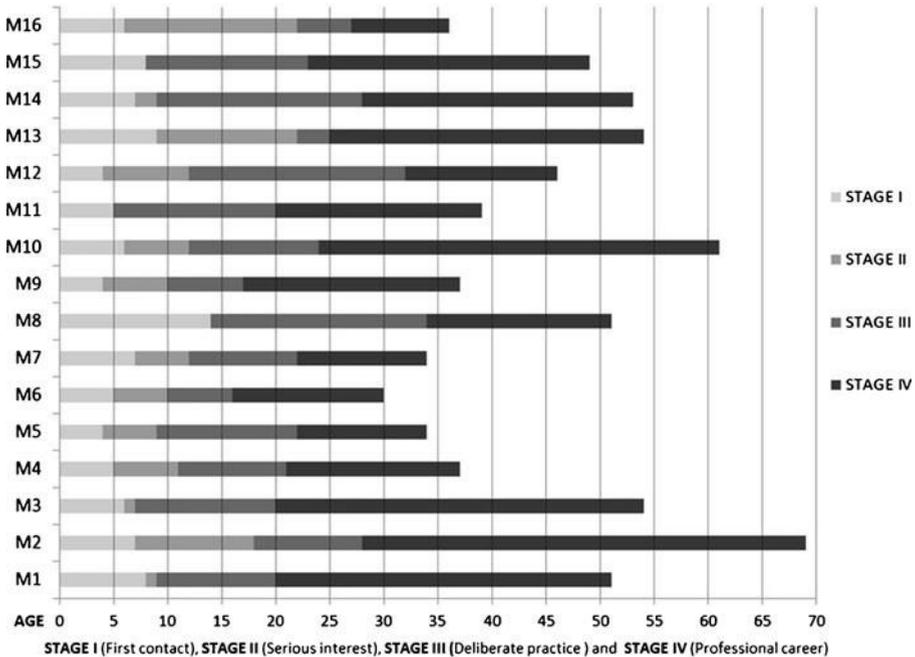


Fig. 1 Participants’ trajectories in becoming professional magicians based on their retrospective interview accounts

Deliberate practice started, on average, at the age of 12 years ( $SD=5.3$ ). For instance, M6 reported starting a successful professional career after 6 years of

practice. M11, M08 and M15 started deliberate practice immediately after having their first contact with magic. On average, participants reported having deliberately pursued practicing magic for more than 10 years ( $M=11.8$ ,  $SD=5.2$ ). Accordingly, the 10-year rule (Ericsson et al. 1993), which prevails in many other domains of expertise, appears to play an important role in magic also. The shortest training time was 3 years, and the longest was 20 years. M13 started deliberate practice aged 22 years, and his professional career started at the age of 25 years. His rapid development is explained by his theatre and dancing background and extremely intensive practice. Moreover, intensive training (and a strong support network) allowed M9 to become a nationally recognised magician in 7 years. The mean age for starting a professional career was 24 years ( $M=23.7$ ,  $SD=5.1$ ). At the time of the interviews, the magical experts had been professionals for more than two decades ( $M=22.3$ ,  $SD=9.8$ ).

### First Contact with Magic

It is intriguing that most of the participants had their first contact with magic when they were very young children. Their initial contact with magic, in many cases, created the spark and inspiration for pursuing a lifelong career in the field. Many of the participants were given books on magic, such as *100 Magical Tricks* (M6) or *Mickey Mouse's Trick Book* (M15) when they were aged between 4 and 6 years. As noted by M6, "I remember this spike of excitement and really simple tricks". Receiving props and instruments for doing magic tricks also played an essential role. In some cases, parents showed the child magic tricks and aroused the child's curiosity. However, many children are exposed to magic at an early age, and thousands of children receive magic sets at Christmas. Most do not become professional magicians. Consequently, an interesting question is why some people remain interested in magic, whereas others do not. Although this question cannot be answered conclusively on the basis of the present data, some suggestions were provided by the interviewees. They emphasised, especially, the importance of having an initial explosive experience of magic – a very strong initial kick. In addition, serious practice of magical skills required systematic efforts to obtain information; only a few people, of all those exposed, engaged in persistent efforts to acquire the necessary magical knowledge. Becoming a skilful and professional magician also required a vast amount of training across extended periods of time. Moreover, it was essential to have some sort of initial peer support, coaching and guidance, as well as a gradually enlarging personal social network related to magic. Finally, many participants reported enormously enjoying performing in front of an audience.

Participants also reported that it was important to have an opportunity to see a magic performance. One participant described how seeing one well-known magician's performance at a community hall affected him: "I think it was that first magician, I might have been around 7–8. Yeah, he made an impression, made the crowd go wild, and become totally mesmerized by the magical performance" (M2). Another participant reported, "at the beginning of the 60's, there was a magic tent at the Finnish Fair, I must have been 6 or 7 when I saw my first magic performance,

and that's probably where the spark came from. Well, it was so incomprehensible. I don't know, the effect was so strong. In some ways, I still haven't gotten over it" (M3). In this regard, television also played an important role. As noted by M1, "As an 8-year-old boy, I saw the Dick Cavett show, which featured incredibly good magicians. I saw Slydini and Dai Vernon, and I was sold; it was the greatest thing that I had ever seen in my life". Several of the interviewees also had an opportunity to function as a magician's assistant: "I must have been 4 or 5 when I got to be the magician's assistant at the circus. It affected me positively and excited me. It was all terribly exciting, with the circus and the scenery, there was a feeling to it. I wasn't terribly nervous, I was assisting this clown magician, but it stuck with me, and I talked about it for a long time afterwards. So it really did have an effect on me" (M5).

These types of critical experiences elicited their interest in the field. In some cases, seeing a magic trick created a burning need to understand how it was actually done; this gave them the impetus to enter the field. In other cases, no influential prior experience (or it was not remembered any more) played a central role in the person deciding to pursue magical expertise: "I was 14 and magic became my thing because my neighbour showed me a magic trick that he learned from a book. It was my first contact with magic ever, and it was sort of like throwing a match into a haystack. That was the effect" (M8). In all of these cases, it is likely that the individuals had multiple contacts with magical activities and that they gradually developed a steady interest in cultivating corresponding expertise. Nevertheless, childhood experiences are likely to have played an important role in the process of seeking one's way in the expert culture of magical activity and towards systematic training, such as that undertaken by M14 who learned from P17 and went to the Circus school of Linnanmäki.

### What Kinds of Deliberate Practice Do Magicians Take Part in?

Participants were asked to report how often they practice their magical competencies. Due to the length of their careers and the diversity of their repertoires, it was not possible to obtain very accurate information about the intensity of practice. On average, participants had practiced for 12 years. The interviews indicated that many participants trained several hours a day and even more than 10 h per day during intensive periods. All participants reported that they practice daily. The minimum time in daily training was reported to be 10 min and the maximum time was 11 h. Initially, the focus was on refining motor skills, and later they moved on to master movement sequences, basic actions and presentation skills. However, the present retrospective interviews did not allow us to determine accurately actual numbers of hours of deliberate practice. The intensity of training in the field of magical activity appeared, however, to correspond to other areas of expertise; the 10,000 h would be reached across 10 years by practicing, on average, 4 h per day ( $4 \times 250$  days per year  $\times$  10). Many of the participants reported more intensive training than that across two decade professional career ( $M=22.3$ ,  $SD=9.8$ ). Sometimes the training seems to have

been mental or not visible, especially for these actions it is obviously difficult to determine an exact time of practice. Intensity of training may vary from one period to another and cumulative amount of it hard to specify. It is important to note that practicing has been frequently present in participants' daily life and sprouted up in many contexts, such as when watching television.

Overall, the results indicated that the participants practice very intensively. It also increases periodically. When there is an impending production, it could be 10 h a day. One of the interviewees stated that "I can't count the hours so...but a lot. From 9 to 5, that's what it was basically" (M12). Another participant reported previously practicing "as much as you can count, it was a burning desire. I just wanted to learn" (M2). He practiced a stage performance for many hours and whole days at a time, including sketches and tricks. Participants reported training many hours a day when developing their magical expertise; otherwise, 'the job' does not work. As noted by M4, "Back in the day I used to practice a lot. And if you've got to learn something new, then that's when you've got to train more. But if you don't have to learn at the moment, then you end up training less".

The participants were also asked about how they practice and what kind of methods they use. The interviewees highlighted the importance of technically perfecting their magical skills, noting that this is essential for both making the magic tricks work and managing stress associated with time-constrained performance situations. All the participants emphasised the importance of repeating various aspects of a performance, so as to make the performance automatic, as well as flexible. Many repetitions are needed to make a performance fluent. The participants talked about practicing their kinetic memory, so as to make movement sequences fluent and automatic. One participant reported practicing a lot. He noted the following: "Of course not every day, but I remember when I was practicing one hand shuffling. Then, even 10 h a day wouldn't cut it. So, after the summer when the autumn is approaching, and I'm starting to pound the show set that I do from table to table, then I train a lot, because nothing is more corny then when a false lift or a false shuffle is on the slow side. It's got to go like boom boom boom boom boom boom, so that it becomes second nature and straight from the spinal cord" (M13).

Different areas of the magician's repertoire require different training methods and techniques (training of finger manipulation, training of birds). One participant reported, "I used to do too much card manipulation, but after getting rheumatoid arthritis, I couldn't do those card 'fans' properly any more" (M2). Currently, "when I have a new parrot, I train the parrot at least 1 h per day, plus at least half an hour for my old parrots, so that adds up to about 10 h a week, so it just kind of becomes a part of this routine. And I don't warm up for the show; maybe I do a few card fans before it. So, if you've got 30 shows a week, then it all adds up. Five minutes of warm-up before the show equals a few hours a week" (M4).

It is essential to achieve a certain level of performance. Some aspects of magical activity, such as situational improvisation, are difficult to practice: "I'd like to develop so that I have more situational intelligence and ability and improvisational skills.

Improvisation is difficult to learn. But of course you can read a lot of comedy, and you can look at stuff like Mr. Bean and Laurel and Hardy and think about why that's funny, and how do they do that, and when he does it like that then it works, but if he did it like that it wouldn't work. So I feel that it's a kind of practice as well. So if you count all of these as practice, then I would say that it's an hour or two per day that I spend watching comedy" (M5).

Some participants said they practice in front of a mirror, whereas others use videos. These are especially important in contexts where misdirection is needed. It was very common for the magicians to use video recordings as mirrors that reflect their activity: "When I was training the stage magic show, it could take up the whole day. I started in the morning, went through the sketches up until one trick. I videotaped them. Thought about it. Chewed on it. Thought about it again. I went through a hell of a lot of ways of doing it and emptied my head, tried to be as creative as possible with it, so that I could find an approach that was as funny as possible, a different perspective; there were no limits. If you're interested in something, and you want to do it from your heart, then you'll end up doing it. You don't count the hours" (M8).

A magic trick has to be practiced repeatedly until each movement is natural and seamlessly integrated with the others, constituting a perfect totality (overall pattern or composition). M6 said that, in his opinion, someone has to be able to perform a magical trick 10 times without mistakes to achieve a satisfactory level of performance. It is essential to practice until the trick is both embodied in the 'muscles' memory' and executable fluently, not mechanically, in varying situations. Beyond mastering tricks perfectly enough to be able to perform them under stressful conditions, the magician needs to be able manage any audience.

M5 and M13 stated that mental training is an essential aspect of the overall training process. They noted that training involves observing and reflecting on practiced magical activity before the performance and during it and using retrospective assessment to develop it further before the subsequent performance. In many cases, they said that it is essential to subdivide a program into its constituent pieces. M13 highlighted the importance of stage-wise practice in terms of: 1) perfecting techniques, 2) gradually creating one's own style, 3) testing it in authentic performance situations and 4) improving the performance by correcting or fixing it. To engage in intensive practice, the person has to be inspired. Through sustained practice, a competent magician works towards finding new ways of performing, gradually accumulating small innovative aspects of performance, thereby causing novel, creative shades of performance to emerge.

### Becoming Professional

Becoming a professional may be regarded as an external validation of the level of performance. Within this competitive field in a small country, a person has to be very good to be able to become a professional magician. Participants considered a professional magician to be someone who is able to make his or her living by doing

magic. Many of them had clearly reflected on the issue and revealed many important conditions for becoming a professional magician in a country like Finland. Becoming a professional requires that you are “proud of your work and committed to developing it” (M6). It is, thus, tied to professional identity and implicated in the process of assuming agency in respect of one’s own career (Juuti and Littleton 2012). The individual has to have developed a certain technique and reached a certain level of performance and desire to maintain it through constant practice. In Finland, it is necessary to be relatively versatile. The repertoire has to be multifaceted and cover magic from one end to another, from close up to child tricks. The difference between an amateur and a professional is that the latter does not practice in a haphazard fashion, trying, in a superficial way, to please everyone. Systematically meeting expectations and, preferably, exceeding them characterise the professional. A part of a magician’s professional ethos is that “you come on time, you’re dressed professionally, you behave professionally, you’re easy to talk to on the phone and in person, you do what you say you will. In all these ways and all these area, you convey your professionalism. It’s not just the time that you spend on stage” (M5). Another aspect of being a professional is to develop a certain brand and public image, which is kept clean, without any kinds of flaws. In Finland, there are many magicians who may be considered as professional, although they may have another profession. Moreover, a professional magician needs to have a strong professional competence, which has been cultivated across a decade or so. He or she needs good mastery of basic magic and to systematically cultivate sophisticated skills and capabilities. One interviewee asserted that the professional pursuit of magic requires that “you pursue magic with respect and self-respect” (M11). Moreover, a professional magician is “one who first of all, most importantly, knows how to perform, knows how to manage the crowd. He has to know how to spin the big wheel. The wheel is the audience that is sitting there, and their emotions” (M8). It would be impossible to manage this line of work without a tremendous amount of self-confidence. Skills and competencies of performing have to be perfected, as well as “technical knowledge and knowledge of how to control situations. Of course, the more difficult the conditions, the more clearly professionalism shows” (M10).

### What Kind of Personal Social Networks Do Expert Magicians Have?

Ego-centric network interviews were used to collect information about the nature of the participants’ magical networks. Towards that end, the participants were asked to indicate: 1) people who have played a significant role in their career, 2) their mentors and 3) collaborators. The interviewees made 137 references to 84 different people considered significant to their career, indicating that some people were referred to multiple times. Most of the interviewees (13/16) referred to other magicians as important people regarding their career, with magicians representing 60 of 84 people cited. Half of those cited were foreigners, thus, illustrating the importance of international collaborations (Table 1).

The analysis revealed that all the participants had a significant person they considered to be their mentor, although a few did not name one. Altogether, there were 25 references to mentors who represented 19 highly regarded magicians. Significant people who were not magicians involved an actress, actor, costume designer, dance trainer/director, managing producer, entertainer, reporter and host (person organising and directing a social event). Nine of 11 of those cited were Finnish. A mentoring relationship may emerge after a newcomer has gained the trust of an old-timer by indicating commitment and enthusiasm regarding the development of magical competence. The mentors are often very selective regarding apprentices they agree to coach. Mentoring starts from supporting technical skills through massive training and moving gradually to improvement of overall performance and designing of magical programs. Mentors share their experiences with newcomers, e.g., by telling stories. The complexity of the cognition is realised in relations between the individual's mind and social practice. Through engagement in various vocational activities, individuals' cognitive processes are engaged and transformed (Billett 2004).

Two magicians were indicated as mentors more than once; P33 was referred to five times (31 %) and P17 three times (19 %). All the mentors were magicians, except P88, a famous comedian. The analysis pointed to certain key people in the Finnish magical field to which most of the interviewees referred when indicating significant persons of the field. These star players in the Finnish magical network included P33, referred to by 11 of the participants; P17, referred to by seven of the participants; and M10, referred to by six of the participants. P33 and P17 were also considered as mentors by several magicians. P33 started his public performances at the age of 8 years, and he had become a professional by age 15. He has won numerous awards and much recognition over his long and productive career. His importance is highlighted by the fact that 11 (69 %) of the interviewees considered him to be a significant person in their career and five (31 %) considered him to be their mentor. However, many were

Table 1 Summary of networking partners cited in the interviews

	Significant persons	Mentors	Collaborators	Foreign magicians
Total	137	25	118	26
Mean	8.6	1.6	7.4	1.6
Standard deviation	4.7	1.2	5.3	3.1
Maximum	22	4	23	12
Minimum	2	0	1	0

Each column represents an independent perspective on the data. Thus, the same person may be represented in several columns

somewhat afraid, as well as appreciative, of his super sharp criticism. Another grand old man of Finnish magic is P17 who was born in the 1920s. He pursued a successful career across all parts of Finland after the Second World War and played a crucial role in shaping Finnish magical networks, sharing knowledge and national and

international contacts. M10 was born in 1950 and became interested early on in magic. In 1974, he started to travel around Finland doing professional magical performances, focused especially on developing new tricks and ‘hilarious’ characters for various performances. He took an active part in building the Finnish magical network by chairing the Finnish Circle of Magic and organising national magical conferences, so as to provide Finnish magicians with training possibilities. He also organised national championships in magic. These events involved public performances in front of large audiences. Thus, not only has the practice of magic cultural and historical geneses, the way in which interactions and communications occur and tools and practices are developed and deployed have been socially and culturally constituted (Billett 2004).

Figure 2 represents a combination of several ego-centric network maps. In accordance with socio-cultural theories of expertise, the figure characterises magicians’ community of practice, with the core consisting of the most central actors in the field, i.e., those names that have been most often mentioned by other magicians. It indicates that the Finnish magical community is a close-knit core: the network includes numerous ties, and it is not fragmented. The core of the magicians’ community is formed of the most well-known and highly esteemed professionals (the black spheres in the middle of the figure). From Fig. 2, we can also see that they mainly function as

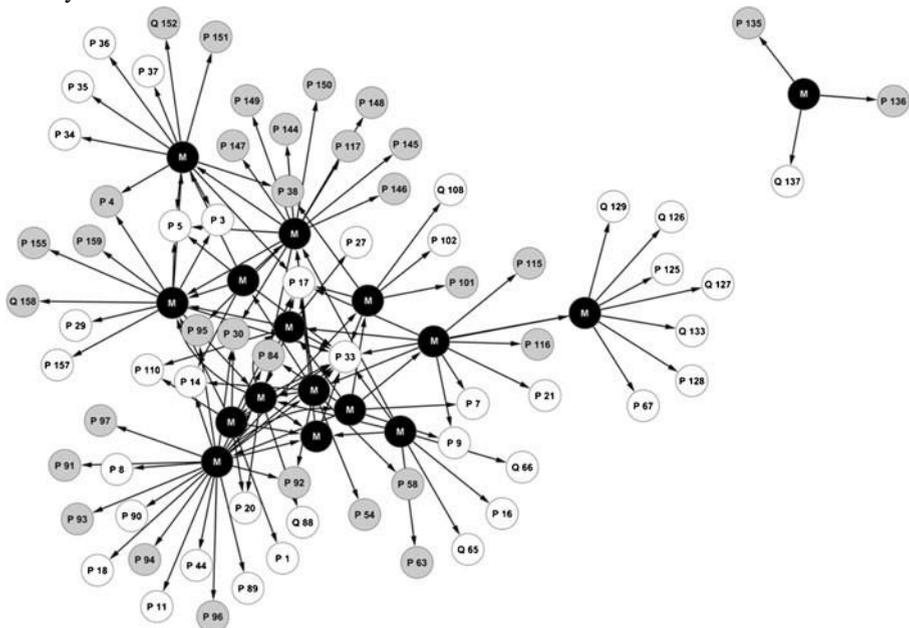


Fig. 2 An ego-centric network of people who have played a significant role in the development of the participants’ careers as magicians (M = interviewees; P = magicians significant in the interviewees’ career; Q = other persons significant in the interviewees’ career. The black dots represent the interviewees, the grey ones represent foreign magicians and the white ones represent Finnish magicians). To protect the anonymity of the participants, the participants’ codes are not included in this figure

a unit. For example, there are no separate cliques in the field. However, some of the interviewees (the black spheres that are slightly further away from the core) do not have current connections with the others. They belong to the older generation or have spent many years abroad and, therefore, have not been able to keep in contact with the rest of the group. Although it has not been extensively discussed by socio-cultural investigators, it is evident that some experienced participants never become truly central ones. It is also possible to lose the central position and become a more peripheral actor. Thus, being involved in the community is not only a question of one's own will. The central position in the network is acknowledged by the peers.

The participants were also asked to indicate collaborators involved in their magical activity (Fig. 3). Altogether, there were 120 references to collaborators. These included 87 different individuals, of which 18 were referred to more than once. The most frequently mentioned (frequencies in the parentheses) collaborators were M10 (7), M9 (5), M15 (4), M11 (3), M3 (3), M13 (3), P17 (3) and M4 (3). Those collaborators who were not magicians were: a conductor, a customer manager, a manager, a producer, a speaker and a theatre director. Overall, the analysis indicated that the pursuit of magic is not a lonely activity, but involves active collaborative relations with other magicians, as well as with external experts. There appears to be central actors with whom many of the participants collaborate. The magicians collaborate by participating in each other's performances, giving feedback and sharing knowledge. Mutual trust plays an important role in sharing of professional

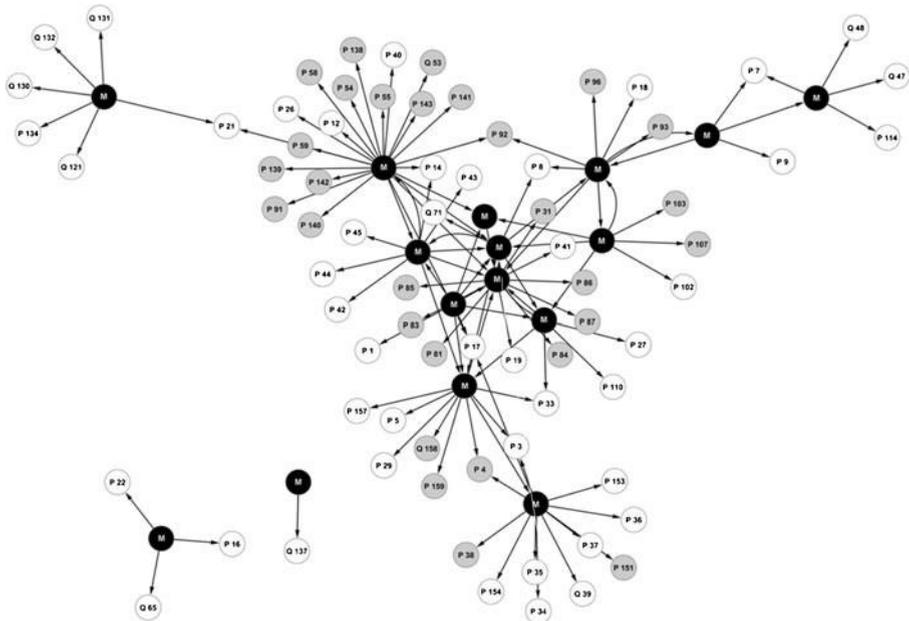


Fig. 3 Ego-centric network of the participants' collaborators (M = interviewees; P = magicians significant in the interviewees' career; Q = other persons significant in the interviewees' career. The black dots represent the interviewees, the grey ones represent foreign magicians and the white ones represent Finnish magicians). To protect the anonymity of the participants, the participants' codes are not included in this figure

skills and competencies. Frequently, the magicians perform in front of their fellow magicians to test new tricks and programs and to receive feedback. This feedback, which represents various perspectives, may cause a virtual 'brainstorm'. To build their community and elicit knowledge sharing, they organise meetings, workshops and conferences and use social media and mobile tools.

### The Evolution of the Culture of Magic in Finland

The interviewees indicated that the national culture of magic has changed from one generation to the next. The traditional way of transmitting magical know-how relied on the master-apprentice model and associated close personal relations and verbal interaction. Senior members were willing to share their knowledge with students who showed a deep commitment to cultivating their expertise. Storytelling seems to play an important role: "In order to deepen my understanding of magic and its history and motivation, he [P17] told me an awful lot of stories, which I feel helped me a great deal in the future" (M6). While it used to be very difficult to obtain information about magic without a personal relationship with the mentors, the national field of magical activity has been considerably transformed through the establishment of new networking structures such as magical journals, magic clubs and the Finnish Circle of Magic, which holds annual conferences and other events. Moreover, the new generation obtains its information very quickly from proliferating national and international books, DVDs and the Internet. The field appears to have become much more international and global in nature, with newcomers routinely utilising international resources (ordering pieces of equipment or complete tricks) to support the development of their expertise. Some of the interviewees indicated that current trends of magical performance appear to be greatly "effect oriented" to meet the needs of the emerging "ADHD generation". They suggested that some performers search for impressive effects rather than cultivating a broad basic competence and an understanding of the history of magic and its basic foundations. Yet, the similarity of the context and the learning mechanisms are not the core issues in developing a learning culture. Rather, learning cultures refer to the social practices through which people learn. Learning is not merely situated in practice, i.e., located 'somewhere'. Rather, it is an integral part of generative social practice in the lived-in world (Lave and Wenger 1991; Hodkinson et al. 2008). There is no official trade union for magicians, or magic school in Finland. Instead, the activities are entirely based on informal communities and societies. Some of the societies are incorporated but then they typically involve different types of performing artists, not only magicians. Major part of the activity is very informal. Magicians may for example meet each other in the same places, among the same faces, jointly sharing experiences and ideas, and providing feedback for their peers.

The present investigation examined expertise in magic retrospectively by interviewing highly regarded magicians. When interpreting the results, it should be taken into consideration that the name-generator technique used in the ego-centric network interviews emphasises strong and reciprocal ties between individuals (e.g., connections between mentors and friends) at the expense of temporary, weak and asymmetric ties. Thus it only covers a minor part of the magicians' social ties. The interviews were focused on addressing collaborations, mentoring and learning, other less positive characteristics of the communities such as distrust and competitiveness or, possibly, stealing tricks were not included in the study. The future research might shed light on the effect of these features.

During the study, the interviewees frequently highlighted three kinds of skills: manual skills, skills in deception and skills to enchant the audience. Although retrospective accounts of developmental processes extended across many decades may not be very reliable, the participants' accounts corroborated each other, providing a relatively coherent picture of typical processes involved in acquiring expertlevel competence in this field. The experts interviewed were nominated by members of the magicians' community and, thus, truly represent, within Finland, the most eminent magicians, and their stories are most interesting in their own right. In accordance with research on expertise, the data indicated that these highly regarded magicians had accumulated a decade or more of deliberate practice before becoming professional magicians, with a few exceptions. Many of them had started pursuing magic as a hobby at a relatively early age, from 4 to 14 years. We found no systematic cause, in terms of early exposure, that could explain why they became dominant players in the field. A large number of young children pursue magic at an early age, but most of them gradually lose interest. Thus, exposure is not a sufficient reason for succeeding in the field. There may be certain personal characteristics that are likely to predict whether a young individual (usually a boy) continues performing magic later on in life. Nevertheless, having an opportunity to socialise to the field at an early age may be an important condition for deep immersion to the culture. One of the reasons not to continue practice may be that in Finland only few people can really earn their living by becoming magicians and even less become wealthy. Being a magician is a risk to one's livelihood.

There is no single explanation for the relative invisibility of women in magic. It is likely to be the result of a complex interaction of sociological and socialpsychological processes. Research studies have shown that the proportion of female members in magic clubs and performances is around 5 %, whereas it is around 37 % in other performance arts. The reasons may have more to do with (1) the sociocultural and historical tradition of performing, (2) the social organisation of the magic profession, (3) the socialisation of gender roles in conversation and plays in Western society, (4) the nature of magic and (5) the relationship of power and control between a performer and an audience. Each of these has been discussed as possible explanations (Nardi 1988).

The strong gender bias in our sample reflects the lack of women in the profession. Indeed, conjuring, generally, is a male activity, which is illustrated by the fact that one of the most prestigious magic societies, The Magic Circle, barred females from becoming members until 1991. Although there has been an increase in female magicians, they are clearly still a minority. According to our understanding, in Finland this is the result of socio-cultural influences, e.g., the relative scarcity of female mentors. However, more research is clearly required to shed light on the reasons for their scarcity.

The development of the participants' expertise in magic seemed to be embedded in a multifaceted expert network. Building such personal social networks (Gruber et al. 2008; Nardi et al. 2000) appears to play a crucial role in fields, such as magic, in which there are no formal training and education resources. Cultivation of expertise, therefore, takes place by deliberately building networking linkages to mentors in their field; transforming initially weak, one-directional linkages to strong and reciprocal ones (Hakkarainen et al. 2004). The fact that the most prestigious magicians or retired Finnish magicians, as well as influential background performers, volunteered to participate in the present networking and interview study indicates their desire to improve the societal and cultural appreciation of the field and support the development of culture and expertise in magic. However, the present data revealed that practically all the interviewed experts had transmitted magical knowledge or received such knowledge.

The results of the present investigation shed further light on the understanding and explanation of the nature of magical expertise, the systematic development of magicians' training, the adoption of creative practices that support the continuous development of expertise, the sharing of magical knowledge and competence and the utilisation of social and cultural capital of professional magicians and mentors. We believe that results pertaining to specialised areas, once better understood, have broad implications. The field of 'expertise' has been researched in many fields (Ericsson et al. 2006). Research on magical expertise is attracting increasing international attention, scientific discussion and constructive criticism in the worlds of academic research, artistic activity and magicians.

Investigators indicate that highly regarded experts have almost always studied with a master teacher, who has also been an outstanding actor in the field and provided a great deal of assistance and support to talented students (Gruber et al. 2008; Sosniak 2006). An important line of future research involves investigating the role that pairs of promising students and their respected teachers play in selective recruitment in many areas of expertise.

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