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Research Report 232

Mirka Koro-Ljungberg

Naming the Multiple: Segments of Scientific Giftedness

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Abstract

This qualitative interview study investigated scientific giftedness, creativity, and academic success among eminent Finnish scientists, 26 male and female professors of the Academy of Finland, who shared their life stories and creativity experiences. The purposes of this study were multifaceted and evolved over time. Originally, the aims of this study were solely to illuminate scientists' paths to scientific success and to describe their creative processes. Eventually, due to readings of various philosophies and qualitative research methodologies, another purpose related to these interests was added. This purpose was to explore the role of methodology in qualitative research reports. Poststructuralist notions of knowledge guided the interpretation and analysis of the data, which were gathered through phenomenological interviews. The theory work within double practices combined interests in hermeneutical phenomenology and poststructuralism. Differences in theory, data, and interpretation were valued and emphasized in the search of thematic similarities and in the study of the "universal gifted man". The themes of sameness and difference within scientific giftedness constructed the central part of this report.

This report introduces three research segments, all based on separate publications. In the first segment, multilayered interpretations of creativity were analyzed through six metaphors that, taken together, problematized singular definitions and descriptions of creativity. Creativity was seen as a crystal or collage: a complex, multisided phenomenon in which no single interpretation but a variety of approaches was introduced. Creativity among these scientists had similar elements such as uncertainty of productiveness, analytic steps of problem solving, flow, utilization of cooperation, luck, intuition, vision, and external stimulation, but the elements were in flux and connected to time and place.

The second research segment utilized the analysis of critical incidents to study meaningful events that promoted scientific giftedness and success. Common themes such as international experience, role of mentors, luck, and deep interest in the domain were identified. Resulting from the second phase of analysis, transformative themes of self-construction of one's life and reflective mind were discussed.

Women's perspectives were analyzed in the third co-authored segment, in which data were combined from two separate studies. Critical events of Olympians and female Academy professors were divided into two major themes: choices and compromises. Environment and society played a crucial role in promoting Finnish women's success and choices related to work and family. Support and positive attitudes helped women overcome obstacles, make academic and personal compromises, maintain interest, and actualize their talents. The balance between multiple subjectivities and choices related to beliefs and values enabled a satisfactory and functional union between personal and professional lives. Despite common choices and compromises, the different combinations of critical events did not illuminate one way to success.

In this dissertation, empirical research led to the philosophical and methodological discussions. The author has not only utilized the thematic similarities of the data but also extended the analysis to highlight differences and variety of interpretations. Instead of summarizing the conducted research per se, this report turned into an arena of textual experimentation and a location of tension, where the line between data, methodology and ideological assumptions became blurred.

Keywords: scientific giftedness, creativity, success, Academy, poststructuralism, alternative interpretations, double practices

Foreword

Some people could call dissertation work a long journey. For me it has been a journey, in its literal meaning, of traveling miles and miles across Finland to meet the study participants and of traveling to Athens, Georgia, U.S.A. to learn more about giftedness, creativity, and qualitative research methods. Hours of writing, writing group meetings, e-mails, and phone calls helped me make sense of the topic, the data, my theoretical orientation and my new, beginning life as a qualitative researcher.

Throughout this project I have been searching for my place in the field, doubting, questioning my steps and approaches. Certainly, I have strongly lived through my data collection phase, sometimes laughing and sometimes crying, and experiencing feelings of despair during data analysis and representation while trying to manage on my own, but at the same time asking for help and advice from others. My goal was to write our story: my interpretation of the participants' life experiences, their interpretations of their stories, and our interpretation of our story (see relativity of knowledge Major-Poetzl, 1983). In addition, my purpose was to describe this journey, my ideas, feelings, and confusion to explain the path of my journey and my temporary position.

I would like to express gratitude to my major professor Kari Uusikylä for constructive feedback and for arranging opportunities for my professional development. I also want to show my greatest appreciation for the pre-examiners, Professor Roland S. Persson from University of Jönköping, Sweden, and Docent Marjatta Saarnivaara from University of Jyväskylä, who have shared their valuable knowledge to improve this report. Additionally, I would like to thank Torrance Center for Creative Studies for collaboration and hospitality, my dear writing group members: Heather Davis, Margaret Hagood, Alecia Jackson, and Kit Tisdale for valuable comments on my manuscripts and ideas, and my long time mentors: Bonnie Cramond, Jane Piirto, Bettie St.Pierre, and Kirsi Tirri, for professional advice and support. I extend my greatest gratitude to my dearest family: Jonas, Emil, Ulla, Markku, Milla, and Mia who have allowed me various spaces to think, read, and write and who have provided love as well as real and surreal support from day to day.

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In Hoschton, GA, U.S.A. last days of May 2001

Mirka Koro-Ljungberg

Contents

1 Introduction

Within this dissertation study naming the multiple faces of giftedness became a dilemma, which required an answer but was unanswerable. When I realized that identifiers and labels were fiction and not referring to universal truth or essence, the obscurity of the naming process became evident. The title of this report was borrowed from Peters's (1998) quote, in which he referred to the scientific community's identifying requests towards poststructuralism, because it summarized the epistemological and methodological challenges that I encountered during this research process.

> [Naming] poststructuralism is problematic because the identification of poststructuralism does not take account of the multiple: multiple formations of thought, multiple sources of inspiration, multiple differences and lines of influence between thinkers…naming the multiple is meant to convey with a sense of irony something of these interpretive difficulties. (p.2)

The concern of creating stable identifiers or naming the multiple has challenged many thinkers, and it also guided me towards the methodological discourse and the overarching theme of this report: sameness and difference within scientific giftedness. In order to name or label scientific giftedness I had to research the elements of sameness but at the same time naming those different and diverse elements turned into an impossible task. Therefore, this report also focuses on interpretative difficulties and on my role as a negotiator between hermeneutic-phenomenological understandings and poststructural discourses [note my emphasis on the philosophical diversity within phenomenology and poststructuralism]. The task of negotiation and the work within double practices[1] made me question my primary, phenomenological intentions to name or describe the essence of scientific giftedness. Data were collected within a phenomenological orientation but their complexity and conflicting nature required other approaches to analysis and representation. Poststructural discourse

[1] By double practices I refer to the theory work, in which philosophical assumptions from two paradigms are combined (see Lather 2000a). In double practices epistemological and methodological tensions challenge researchers to create research designs, in which different paradigmatic orientations coexist in fruitful and productive ways. For example, in poststructural ethnography cultures reinvent themselves, mutate, shift, and produce multiple political agendas. Whereas, in feminist ethnography data are collected through ethnographic methods and gender becomes a category of analysis.

offered language to discuss and analyze differences and discrepancies found in data. In order to demonstrate those differences and alternative methodological choices, I created a report format, which introduced domain knowledge of the selected three articles and also highlighted the issues of analysis and data representation that I faced during my research project. Because poststructuralism emphasizes representation and language I provided readers with data examples from the original articles. Poststructural notions of segmented realities (e.g. Sarup, 1993) and structures supported the format of this report, which became segmented in two levels (see also two-fold purpose of dissertation work Hanrahan, Cooper & Burroughs-Lange [1999]): segments of research analysis methods (analysis of metaphors and critical incidents) and segments of selected elements of scientific giftedness (creativity, academic success, and environmental influences). All three research segments simultaneously produced the notions of sameness and thematic similarities but also continued the dialogue between research and text by troubling the aims of "true" categories and "universal truths" (Manning, 1995).

At the beginning of the study my goal was to identify, describe, and understand the phenomenon of giftedness, and I wondered if I could become a "pathmaker" (Harrington & Boardman, 1997) or a "beyonder" (Torrance & Safter, 1999) in science. Would I have the characteristics and capabilities to succeed in a scientific career? I wanted to know more about scientists' lives and what elements they described as important for success (e.g.,Uusikylä, 1996; Walberg & Herbig, 1991), elements that I could then use to transfer to my own life. I desired to know what new meanings or "accounts of space, time, and the world as [lived]" (Merleau-Ponty, 1962, p.vii) scientists would create.

When reading the scientists' life stories and theories of giftedness, creativity and success, I realized how all knowledge is situated and how my world, as well as the world of these scientists, appeared complex and layered. Complex, biased, and situated data made it difficult to capture the phenomenon of giftedness. A hermeneutical interpretation of phenomenology (Heidegger, 1993) became problematic after I realized my incapability to "go into things themselves", to understand the authentic experiences of Academy professors, and to present shared features of the "life-world" (Ashworth, 1999, p.709) of gifted individuals. Merleau-Ponty's (1962) famous phenomenological words "the world is not what I think, but what I live through" (p. xvii) made me question my right to describe scientists' lived experiences, my capability to enter their worlds,

and to put aside my personal and professional presuppositions. The hermeneutical tradition where "the interpreter genuinely opens himself to the text by listening to it and allowing it to assert its viewpoint" (Linge, 1976, p. xxi) troubled me. Texts in the transcripts spoke to me in various forms, expressing a diversity of biased viewpoints. The ability of hermeneutical consciousness to ascertain what is questionable (Gadamer, 1976) raised questions such as: questionable for whom, where, and when? I could not lift "up of something out of the alien" (Gadamer, 1976, p.15) because there was not a singular alien but many. These data and the diverse explanations, even within data stories of individual participants, made me reconsider my use of phenomenological orientation in the analysis and representation phases of the study. The thought of "shared baseline meaning" (Ashworth, 1999, p.720) was interrupted by multiple meanings created by single participant. I did not feel legitimate in describing the essence of *their* actual experiences because I was never able to free myself from my biases or presuppositions. Additionally, the phenomenological goal of reduction, turning from things to their meanings, was intermitted by complex and non-linear webs of meanings created by participants and also by me.

After reading about the legitimation crisis (Habermas, 1975) and the postmodern turn, I found that a hermeneutic phenomenological orientation did not make possible the questions I wanted to ask from data nor did it meet my needs or fit data's multiplicity and complexity. Instead, a poststructural framework made me "sensitive to differences" (Lyotard, 1979/1984). After reading a variety of different and sometimes even conflicting life stories and experiences of the participants and influenced by poststructural thinkers I realized that everything, including theory and developmental processes, are constructions of the scientific imagination (Gruber, 1986). Participants' stories as well as my stories were equally fiction and only referred to the writing itself. In fact, Foucault (1984) asked what difference does it make who is speaking or writing because writing is never completed only referring to itself. It was my task to rewrite my, their, our stories in scholarly ways while simultaneously emphasizing perceived fragmented realities (Paulston & Liebman, 1994; Sarup, 1993) and the situated nature of knowledge (e.g., Denzin, 1997; Foucault, 1971/1972; Gergen & Gergen, 2000; Haraway, 1988; Putman & Borko, 2000; Tierney, 2000).

Derrida (1967/1997) encouraged me with his assertion that we "begin wherever we are" (p.162). Therefore, I begin this report by looking at

how various definitions of giftedness have became a part of the everyday practice and "understandings" in gifted education and how the present discourse of giftedness constructs the "universal gifted man". While I do not believe that labels or categories refer to "reality" and thus focus this work on the celebrations of differences in attempts to dislocate similarities, I nevertheless value similarities and use the term scientific giftedness (see also Innamorato, 1998) to refer to the talents of these scientists. Scientific giftedness is a differentiating definition constructed from various talents (e.g., academic achievement, creativity, and emotional intelligence), that are influenced by environmental factors such as domain, field, and society. In the article of critical events (Koro-Ljungberg, in press-a) I used a definition of high academic achievement (e.g., Goldberg & Cornell, 1998) to emphasize academic achievement as a component of scientific giftedness. Yet, I was not comfortable defining these scientists as academically talented (e.g., Cameron, Mills & Heinzen, 1995; Noldon & Sedlacek, 1998; Olszewski-Kubilius & Yasumoto, 1994), or eminent (Simonton, 1999) or as scientifically gifted. Because my attempts of naming the multiple turned into an ongoing dilemma, all of these definitions are problematized. But, I realized that I must live within language, and I chose to believe like Spivak (1997) that words are "inaccurate yet necessary" (p.xii). Words and labels such as giftedness and creativity are necessary for reference and to locate temporal, situated meanings, but they do not provide fixed true understandings.

This report is based on three original publications, which are in this text elaborated and rewritten in order to produce an independent, integrated, and more coherent report of the dissertation research and selected articles. However, during this research process I noticed a lack of methodological discussions in the field of gifted education. Therefore, instead of summarizing conducted research per se, I believed that in this report it was more important and valuable to highlight my journey from empirical research toward larger methodological and theoretical discussions. Kilbourn (1999) stated that "a doctoral thesis should demonstrate self-conscious method. It should betray the author's sensitivity to concerns of epistemology, to concerns about the connection between method and meaning" (p.28). Following his advice I structured the report to illustrate the juxtaposition of method and meanings, which were connected to the domains of giftedness and creativity. Additionally, my complex, multidimensional, and conflicting data on one hand allowed but on the other hand required me to address some epistemological and methodological

points in question. In particular, the first research segment, which is published in a premiere international qualitative journal, utilizes data as a tool to discuss methods and to address methodological concerns about creativity.

1.1 Introducing the limitations of this dissertation report

I would like to introduce the limitations of this report upfront and at the beginning so that readers can better situate and prepare themselves for reading alternative data representations constructed in a poststructural framework. Despite the various benefits of utilizing a strong methodology, every theory and alternative methodological orientation makes some arguments possible and others impossible simultaneously, provoking certain analysis and representation where always the "necessary silences" (Kumashiro, 2001) will still remain absent. For example, a phenomenological analysis of this study would reinforce the description or essence of the phenomenon of giftedness, and a structuralist interpretation would emphasize the systematic structure of scientific giftedness and the creative process. Kumashiro (2001) continued that "text will reflect the realities of some people but miss those of others; it will represent the voices of some groups but silence those of others; and in doing so, it will challenge some stereotypes while reinforcing others" (p. 7). For instance, this research does not answer questions such as: What would be emphasized in the investigation of critical events from male perspectives? How would critical events or creativity be constructed in the lives of successful scientists in other countries? Kirsch (1999) noted that scholars are always products of their culture, data are limited and partial, and interpretations are sometimes complex and contradictory. Because this dissertation report is based on the culture and genre of academic publication writing, readers must keep in mind that journal publishing sets certain limits on page length and on the inclusion of the quantity of empirical data presented. Therefore, data examples represented only part of original data collected and analyzed, reflecting and adopting guidelines of journal writing.

Someone might argue for the lack of "empirical evidence" of this report. In addition to a complete research process including detailed data

analysis (see description of research process in Appendix A), the post-structural notion of impossible equation between reality and text, and limitations of journal writing, this report presents a lot of data, when data are viewed in the boarder sense. Following the work of others (e.g., St. Pierre, 1997a), descriptions, observations, thoughts, and documents of participants but also of the researcher and of other theorists are all data in this study. They all reflect varying realities, which affect and contribute to the readers' conception of the phenomenon in question.

In addition to the researchers who seek thick description or rich evidence of empirical data, researchers aiming for philosophical orthodoxy will question the value of this report and study. As mentioned earlier, empirical research was conducted in the hermeneutic phenomenological paradigm. However, theorizing the findings as well as representation was informed by the philosophical assumptions of poststructuralism. Therefore, phenomenological traces are present through out this report because they guided the initial data collection and produced used data. Some researchers might claim that double practices are condemned to the philosophical conflicts or to the theoretical weaknesses, because they do not embrace a single way of ontological knowing or they do not stay devoted to the paradigmatic characteristics. They continue postulating that paradigmatic negotiation can cause philosophical misuses and misunderstandings. I would argue that a fruitful and thoughtful research conducted within double practices demonstrates qualitative researchers' methodological insights, flexibility, and openness with data. It allows researchers to bring together benefits of both paradigms, which leads to more situated research designs and purposeful data representations.

Due to the research design of this study the generalization possibilities of these findings are limited. Data were collected from a special population, bounded by situational factors such as environment, culture, and society. Rather than generalizability, the research findings promote individualistic, situated, complex, and multilayered conceptions of scientific giftedness, creativity, and success. Additionally, research purposes and questions do not address school-based practices but relate to the theoretical assumptions behind the practices. More than generalizing about population or school-based practices based upon the data, this study can be generalized in the terms of theoretical and methodological ideas used to analyze the data.

Even though alternative data representations have begun to emerge within scientific writing and qualitative report formats (cf. Blumenthal,

1999; Cary, 1999; Lather & Smithies, 1997; Peshkin, 2000; Richardson 1985) experimental forms of qualitative data representation still meet resistance and face some disbeliefs concerning the trustworthiness of interpretation and representation. Claims of fictionality or non-scientific nature of alternative data representations are addressed in this report by poststructuralists notions related to validity (see, p.23 in this document). Among creativity researchers, notions of resistance when creating something new are widely documented (cf. Csikszentmihalyi, 1996; Gardner, 1993a). This study proves no exception. For example, Academy professor Reijo noted in his interview the difficulties of promoting a new idea. Reijo investigated consumer laws (details of this example have been changed for reasons of anonymity and confidentiality) and proposed a legislative initiative to protect the rights of consumers. Legislators and business leaders refused to consider Reijo's proposal and dismissed it as inappropriate. Several years later Reijo's initiative was reinvestigated and executed.

Readers working from other paradigms might view this study differently, possibly questioning the novel and experimental representation formats, and seeking to find rich descriptions or categorized structures analyzed with numbers. Some readers may find this text lacking clarity, traditional structures, or hypothesis to be tested. Reader's mourning for totality or completeness of humanistic discourse might view this text as illogical or inconsistent. Not every scientists or reader will resonate with my writings, interpretations, and analysis because their personal interests, worldviews, and philosophical orientations differ from my own. It is acceptable to disagree with my findings, paradigm, or textual representations. Research and interpretations within poststructuralism are always open for dissent. In fact, I encourage well-grounded disagreements, diverse opinions, alternative viewpoints, and poststructural re-readings: all of which promote a multiplicity of scientific discourse.

2 Creating Language to Enter the Discourse of Difference

I began this research project partly searching for the constructed nature, central essence of the experiences of the "universal gifted man".[2] Davies (1997) described the "myth of essential and universal Man as essential, because humanity—human-ness—is the inseparable and central essence, the defining quality, of human beings; universal, because that essential humanity is shared by all human beings, of whatever time or place" (p. 24). When defining and studying scientific giftedness the humanistic essence of giftedness or talent is emphasized among many theorists (e.g., Feldhusen, 1986; Feldman, 1986; Tannenbaum, 1986) and the search for characteristics shared by all the scientifically gifted has dominated the discourse in the gifted field and has led to current educational practices. Universal narratives (McLaren & Farahmandpur, 2000) of gifted individuals highlight essential features and characteristics unaffected by time, place, or circumstances. In such narratives every gifted person is viewed as an individual, but the individual's characteristics and experiences are part of larger embracing humanity, part of common "human condition". Those notions of gifted individuals were what I found in my research of the domain literature at the beginning of this project. Aims to locate the essence of the experiences of the "universal gifted man" guided my actions when I planned my study and initiated data collection.

Intrigued by poststructural researchers' desire to doubt universal truth claims and to disrupt traditional research concepts of data (Lather & Smithies, 1997; St. Pierre, 1997a), the field (St. Pierre, 1997b), and representation (Richardson, 1995; Wolf 1992), I began to question my initial understandings of giftedness and of a traditional qualitative research process. I found that alternative representations and multiple layered texts (see Lather & Smithies, 1997) better met the needs of this research and these complex data. For me, theories of poststructuralism offered a language to dislocate and question the central essence of the "universal gifted man", and they made possible new understandings of situated knowledge (Richardson, 2000; St. Pierre, 2000), of non-linearity, and of

[2] "Man" is referring to the mirror image of one human, who is representing every scientifically gifted individual regardless of gender, race, nationality or age.

reflective texts. Through these theories I was able to trouble taken-for-granted concepts and to explore new ways of knowing while simultaneously critiquing my choices and interpretations. Questioning and doubting my field and my research methods became both possible and necessary for me through the theories of poststructuralism, which negated the search for a single truth, and in this study the search for a single truth about giftedness and creativity.

According to Sarup (1993), Lyotard did not acknowledge and support the legitimation purposes of modern age. He believed that universally valid knowledge for humanity was impossible to build. In fact, Lyotard criticized united knowledge, foundationalism, "metanarratives" (Lyotard, 1979/1984), and the neutrality of science. Foucault (1971/1972) supported the limitations of knowledge and noted that "knowledge is defined by the possibilities of use and appropriation offered by discourse" (p.183). Not only were poststructuralists skeptical about common beliefs of "universal man" (Davies, 1997) or about beliefs concerning knowledge, truth, power, self and language (Flax, 1990) but they wanted also to push the boundaries towards a de-centered subject, situated truth, multiple selves, and new constructions of texts and discourses (Lather, 1993; St. Pierre, 1997b).

As explained earlier, language and discourse in poststructuralism are seen as productive of meanings and realities. Meaning is created or generated through difference rather than through identity (St. Pierre, 2000), and no understanding, discourse, tradition, or theory is privileged (Richardson, 2000). Some theorists (e.g., Alcoff, 1995; Richardson, 1993) preferred to refer to plurality of differences where not a difference but differences construct meanings and dismiss single positions of significance. Encouraged by Richardson's (1993) request to leave space for differences to speak and to celebrate tension as well as to acknowledge the differences, I utilized the thematic similarities of these gifted scientists but continued my analysis and representation beyond primary themes of similarities, which enabled to leave space for discussion of differences. While creating space for differences I noted the difficulties of doing so: there were always invisible components of difference, which were impossible to capture. Derrida (1967/1997), for example, described the invisible components of difference, which are constituted by its never-fully-to-be-recognized-ness. There is always a trace, a line of identifiers referring to the past. Concepts "receive meaning only in sequences of differences, one can justify one's language and choice of terms only within the topic and

an historical strategy. The justification can therefore never be absolute and definitive" (Derrida, 1967/ 1997, p. 70).

Poststructuralism assisted me to build philosophical arguments regarding the acceptance of differences and allowed acknowledgements of multiple definitions, which all appear as equally true. In poststructural discourse truth is only a creation, "a thing of this world produced only by virtue of multiple forms of constraint" (Foucault, 1980, p.131) which made me reconsider the nature of my interpretations and the neutrality of science. Additionally, Foucault's (1980) statement that "each society has its régime of truth, its 'general politics' of truth: that is, the types of discourse which it accepts and makes function as true" (p. 131) interrupt my notions of general politics of truth within gifted education and questioned its legitimacy.

3 Locating the "Universal Gifted Man"

Meeting the challenge of multiple gifts, talents, and transformations from childhood potential to adulthood achievement requires many decisions. The role of definitions clearly constitutes as a ground force to our decisions. The purpose of this section is to differentiate how various definitions of giftedness have either promoted humanist orientation of gifted movement (Dai & Renzulli, 2000) through the search of similarities or emphasized differences. Haensly, Reynolds and Nash (1986) claimed:

> Definition of giftedness must take into account what and how abilities have productively come together (coalescence), the type of setting that elicits expression of those abilities (context) the opposing forces that generate a divergence of expression (conflict) and the quality, intensity and duration of that expression (commitment) (p.132)

Heller (1993) divided definitions of giftedness based on their intended use, dominant social norms and considerations, or choice of measurement instruments. Mönks and Mason (1993) provided further theoretical categorization of gifted definitions by identifying trait-oriented theories, cognitive component models, achievement-oriented models, and socio-cultural models.

The search for similarities in research of gifted education has produced various educational benefits and promoted the establishment of effective teaching practices (e.g., pull-out programs, long-term gifted programs, acceleration possibilities, gifted curriculums) to better meet the needs of gifted children. Also, understandings of special needs of gifted children as a homogeneous group have initiated political and activist movements. Tests, evaluation criteria, and identification methods seemed, in many cases, to search for the "true gifted personality" and constituted identification. For example, the Marland Report given to the Congress of the U.S.A. in 1971 defined gifted and talented children as those who

> are identified by professionally qualified persons who by virtue of outstanding abilities, are capable of high performance. Children capable of high performance include those with demonstrated achievement and/or potential ability in any of the following areas, singly or in combination: general intellectual ability, specific academic aptitude, creative or productive thinking, leadership ability, visual and performing arts ability, psychomotor ability. (in Piirto, 1994)

In the past, researchers' emphasis on similarities among gifted children has contributed a great deal to the field of gifted education by developing different models, checklists, or characteristics describing giftedness. For example, Haensly, Reynolds and Nash (1986) see giftedness as an ability, which relates to and interacts with one's environment such that gifted persons

1. see possibilities where others do not,
2. act upon those possibilities in an extraordinary way or with extraordinary skill,
3. maintain sufficient intensity to overcome obstacles over a sufficient duration of time,
4. produce a response (material or physical),
5. share the outcome of the process with society in some temporal or permanent way (p.132).

Feldhusen (1986) promoted sameness among gifted in his more traditional psychological definition and included the 'g'-factor and motivational characteristics as a part of giftedness. According to Feldhusen, giftedness included: a) general intellectual ability (which facilitates the acquisition of knowledge and supports formal-operational thinking. Necessary levels of general intellectual ability vary from field to field or discipline to discipline), b) positive self-concept, c) achievement motivation and d) talent (p.112). Tannenbaum's (1986) definition emphasized subcategories of giftedness, and he postulated that the five factors (superior general intellect, distinctive special aptitudes, the right blending of nonintellectual traits, a challenging environment, and the smile of good fortune at crucial periods of life) are different in every talent domain. Additionally, he claimed that every factor was needed in order for a child to become "truly gifted". On one hand, Feldman (1986) referred to the multiplicity of giftedness; but on the other, he concluded in the notion of sameness that only a few individual, highly gifted people can master or have all characteristics. As he explained

> Giftedness from this standpoint can manifest itself in at least three ways: it can mean faster movement through the stages of mastery of a domain, it can mean movement to more advanced levels that very few reach, and it can mean deeper understanding of each of the levels reached. For the small number of individuals, it may mean all three things (Feldman, 1986, p.295).

Similarly, Simonton (1999) referred to differences, but he treated them as categories. Simonton based his definition of eminence on the life-span studies of extraordinary individuals. He included 'g'-factor as part of his determinants of eminence in addition to other individual differences (productivity, personality, psychopathology), development (family pedigrees, childhood precocity, birth order, early trauma, mentors, formal education), and sociocultural context (political, economical, cultural, ideological).

While the perspective of searching for similarities has influenced researchers of the study of gifted for at least the last 40 years, the perspective of difference among gifted initiated the "gifted movement". The need for educational reform became topical when schools could not respond to the high variance among diverse learners. At the beginning of the last century, scientific giftedness was strongly connected to intelligence and to the general development of giftedness. Inferior abilities were used as criteria to provide opportunities for special individuals (Terman & Oden, 1947), but also to discriminate or to exclude other individuals from gaining certain benefits. Terman (1925) promoted the significant role of IQ as well as stable and genetic characteristics of gifted whereas Guilford (1967) believed in multiple combinations of intelligence and was among the first to speak for differences in abilities of gifted. His three-dimensional model of intellect illustrated various possible combinations of giftedness and did not prioritize any specific dimension but presented a large number of narrow factors affecting intelligence. Guilford's theory was believed to explain the differences among gifted. Later, Gardner followed Guilford's thoughts by introducing his theory of multiple intelligences (Gardner, 1993b), which dominated the field of gifted education in Finland when this research project began.

The efforts of Gardner (1993b) and Guilford (1967), among others, to maintain differences and individuality of gifted children and adults have affected other researchers as well. The changing nature of scientific giftedness has been reported by researchers who have had difficulty capturing the phenomenon of "giftedness", the "gifted individual", or the "universal gifted man". For example, Uusikylä (1996) asked why differences are not accepted, and Sternberg (1991) postulated that "giftedness cannot be captured by a single number" (p.45). Csikszentmihalyi and Robinson (1986) referred to the constant movement and instability of talent, explaining that "talent cannot be a stable trait, because individual capacity for action changes over the life-span, and cultural demands for

performance change both over the life-span and over time within each domain of performance" (p.264). In Gagnè's (1991) differentiated model of giftedness and talent he distinguished between giftedness and talent and referred to giftedness through aptitude domains (e.g. intellectual, creative, socioaffective), which are non-systematically developed and to talent through fields (e.g. arts, science and technology, education), which reflect systematically developed skills. Gagné (1991) viewed giftedness as a competence but talent as a performance that is distinctly above average in one or more domains of human aptitude. Wu and Chen (2000) discussed differences such as variety of interests, role models, academic achievement, range of creative activities and expression abilities among Olympians in Taiwan.

I interpreted other researchers' notions of the complex and situated nature of giftedness as methodological moves towards differences. For example, research of Bonneau and Amégan (1999), Csikszentmihalyi, Rathunde and Whalen (1993), and Noble, Subotnik and Arnold (1999) illustrated the socially or interactively constructed talent models where talent can be identified differently depending upon a variety of situations, domains, time, and place. Additionally, Lu Hafenstein and Tucker's (1999) study demonstrated the individual nature of giftedness where general ability, aptitudes, environment and other non-intellectual factors combine in unique ways, and Gardner (1997) referred to the unique extraordinariness.

In this study, I acknowledge the theoretical work of others and therefore utilize both similarities and differences among scientifically gifted. Thematic similarities of this group of professors can promote the rights of other gifted and creative scientists and support the generation of special services; it can speak the language of politics. The power of difference, which refers to the non-stability of themes, labels, strategies, or solutions, targets de-centered subjects of gifted education and allows more space for outliers to be recognized. The construction of the "truth" of gifted individual has become problematic because scientists' capacities, characteristics, goals, creative processes and critical events change over time.

4 Framing Research

In the following section I present the research questions of this study, which extend beyond the summarized articles to cover the whole dissertation research. Theory in these publications as well as in this report is combined with my writings and data. During the research process, first a hermeneutic phenomenological paradigm and later poststructural framework directed the creation of research questions, formulated data analysis, and guided my interpretations, and writing processes (see Appendix A for illustration of the research process). Consequently, research questions and the stated purposes of the study have been in flux throughout the research process. The domain context of research questions has remained the same throughout the process but the philosophical discourse and methodological approaches have changed. I illustrate the change and the flux by presenting two sets of research questions. First, I will state my domain related research questions, which guided my research plan and data collection. Second, I present methodological questions, which arose from domain questions to better meet the needs of the complex, multilayered data. Methodological questions directed my data analysis and representation.

4.1 Research questions

Domain related research questions:

1. *How do professors describe their scientific giftedness and creative processes?*
2. *What elements have contributed to the professors' scientific giftedness and academic success throughout their life-span?*

Methodological questions:

1. *How does a metaphorical, multilayered interpretation change the nature of research?*
2. *What kinds of knowledge are produced through the critical incident method?*

4.2 Participants

For this study, I interviewed 26 professors of the Academy of Finland, 5 females and 21 males. I selected Academy Professors because they represented the most recognized and successful scientists in Finland whose scientific giftedness and eminence have been evaluated through international peer-review processes. At the time of the interviews (1998) participants ranged in age from 35 and 62. Every year the Academy of Finland, which is the most respected and valued research organization in Finland, selects a few eminent scientists to be appointed to a five-year funded research position. According to the application guidelines set by Academy of Finland, Academy professors are known as competent and internationally successful researchers who contribute to the development of their domain. Selected scientists are able to concentrate on research work without many other scholarly commitments (i.e., teaching and administrative duties), but usually they lead their research group and mentor young scientists throughout their appointment. These eminent researchers in their fields represent various disciplines including, for example, medicine, biology, chemistry, physics, philosophy, education, sociology, religion, and history.

In the following I present background information of the scientists, which was collected from interviews and curricula vitas (see Table 1). All the names of the scientists are changed throughout this document and related publications. Numbers in the table are used only as estimates and to provide guidelines. For example, the number of children professors had did not necessarily become clear during the interviews. Professors whose children are listed in the table initiated the discussion related to the children whereas some professors preferred not to talk about their personal lives. At that point, I made an ethical choice to respect their preferences and did not require them to discuss the details of their personal lives. Also, the criteria used when listing one's publications varied. Some professors differentiated patents, book chapters, etc., whereas others gave only an overall estimate of their peer-reviewed publications because they recorded only partially their productivity in their curricula vitas.

Table 1. Academy professors (1998)[3].

Name Female/ Male	Age	Marital Status (children)	Field	Publi-cations	Years in Academy	Age at the time of doctorate
Arto, M	46	Married (3)	Biology	110	7	28
Eija, F	48	Married (2)	Biology	40	0	32
Juha, M	45	Married (3)	Biology	50	9	26
Simo, M	57	Married (2)	Biology	160	6	29
Ville, M	53	Married	Biology	117	0	26
Helena, F	44	Married (3)	Medicine	115	5	29
Jaakko, M	47	Married	Medicine	83	15	31
Jyri, M	61	Married	Medicine	255	0	26
Keijo, M	46	Married	Medicine	284	7	28
Leena, F	50	Married (3)	Medicine	170	9	27
Jari, M	58	Married	Soc. Sc.	180	0	29
Jussi, M	52	Married (2)	Soc. Sc.	135	5	23
Kalle, M	54	Married	Soc. Sc.	52	8	30
Mikko, M	50	Married	Soc. Sc.	196	4	40
Niilo, M	61	Married	Soc. Sc.	300	7	30
Reijo, M	59	Married (3)	Soc. Sc.	250	5	29
Seppo, M	51	Single	Soc. Sc.	140	0	28
Suvi, F	52	Married	Soc. Sc.	109	3	28
Jukka, M	57	Married	Chemistry	180	0	26
Kaarina, F	58	Married	Chemistry	261	0	26
Simo, M	55	Married (2)	Chemistry	85	8	35
Niko, M	53	Married	Physics	700	0	29
Pertti, M	64	Married	Physics	250	0	26
Risto, M	48	Married (3)	Physics	123	5	31
Sakari, M	50	Married (2)	Physics	350	2	27
Veini, M	64	Married (4)	Physics	270	0	28

4.3 Data collection

In 1998 I conducted three pilot interviews (see Kvale, 1996) at the University of Tampere, interviewing three professors of medicine. In these

[3] To maintain participant confidentiality, I use the term social sciences to refer to the fields of philosophy, education, sociology, and history.

interviews I tested the usefulness of interview themes I had created. The preliminary interview guide produced rich data; and although each pilot interview lasted three hours on average, I decided not to change or to shorten my interview guide. After the pilot interviews, I approached and contacted the whole group of Academy professors because I did not know how many would participate and how much data planned interviews would produce. Additionally, I wanted to capture their experiences as a group of highly successful scientists. Twenty-six of 29 scientists agreed to participate. After receiving professors' permission letters indicating willingness to participate I met each professor individually either in their offices or in their homes.

Semi-structured (see Kvale, 1996; Merriam, 1998) or sometimes named as unstructured interviews (Fontana & Frey, 2000) where interview guide contained topics to be covered, lasted 2–4 hours each (See Appendix B for interview guide). According to Fontana and Frey (2000), in unstructured interviews the question format is semi-structured, the role of interviewer is somewhat directive, and the purpose of the interview is phenomenological. Denzin (2001) argued that the researcher's role during the interviews is to make the personal public. In this study, where my purpose at the time of interviews was to understand the experiences of participants, I had an interview guide with thematic questions. Interviews were divided in two parts. At the beginning of the each interview I handed out a question paper where I asked three questions ("Tell me about…"). These open-ended questions formed the first part of the interviews, leaving space for the interviewees to produce their own answers, to express their thoughts and experiences, and to point out meaningful elements of talent development without me influencing their views and responses.

In the second part of the interview, I did not ask thematic, descriptive questions in any specific order, but created a conversational atmosphere in which I educed information related to the interview topics and themes. At the end of each interview I returned back to my interview guide to verify that all topics were covered. All interviews were conducted in Finnish except for one, during which we spoke Swedish. I transcribed all interview data into Finnish and listened to the tapes at least twice to correct possible transcribing mistakes. Additionally, I translated all data segments used in this report and in other publications into English.

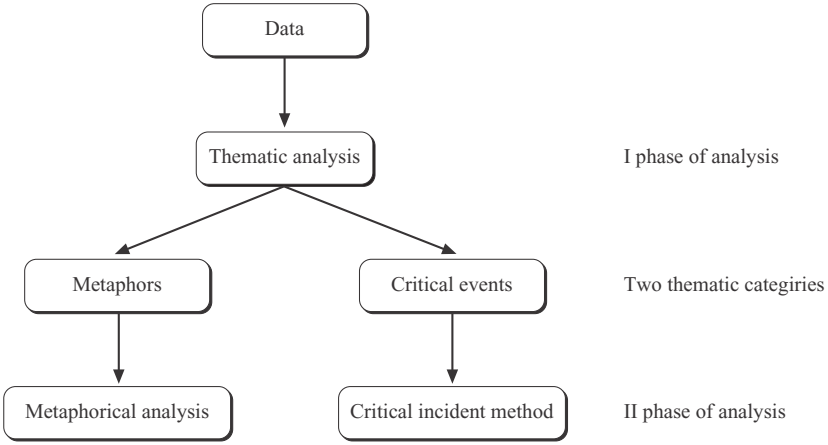
After the interviews I asked participants to provide me with their curricula vitas. Most scientists handed me their vitas during our meetings, but some of them sent them to me later. The purpose of collecting curricula vitas was to provide supplementary information about professors' careers and to help clarify conflicting data related to the critical events. Directly every evening after each interview I wrote reflective notes about the interview situations and settings, my feelings about interviews and participants, and my interpretations of the participants' actions and reactions during the interviews (See Appendix C for experiences from the field).

4.4 Data analysis of the overall study

For me writing a qualitative research report became a method of inquiry (Richardson, 2000), an opportunity to learn something I did not know before. I learned when I wrote and I wrote what I learned. The purpose of the following data segments was not to illustrate all data collected and every individual description of a theme or life story. More so, I preferred to write about things that I wanted to learn and believed my readers needed to know. It may seem that I have use less original data when compared to more traditional, thematic data analysis reports; but indeed, I have used the quotes that illustrated effectively the argument I wanted to make. As I mentioned in the introduction, data in this study are viewed in a broader sense (see e.g., St. Pierre, 1997a) where in addition to interview data, curriculum vitas, and reflective notes data included my own supporting and contrary thoughts, feelings, observations, and analytic notions. For example, in the first research segment, data about creativity came from interviews and their metaphorical interpretations produced by interviewees. But also, my conflicting thoughts and interpretations of their metaphors turned into data, which were analyzed and written about. When working from the poststructural paradigm, where generalization desires have been reevaluated and realities are constructed through language, all quotes and all data appeared as "important" or as "less important". The quantity of "original" data represented did not make validity claims of this study any stronger as is illustrated in the section of validity. A large, complex, and rich database as well as alternative sources of data mentioned above allowed the methodological move during the analysis and representation processes.

My data analysis was twofold (see Figure 1). I began data analysis by searching for similarities through the themes related to the development of scientific giftedness, academic success, and creativity within each of the 26 individual interviews. I used a qualitative data analysis program (NUD*IST) to help organize data during the first phase. From various themes found, I decided to analyze two groups of themes (themes related to critical events and themes described through metaphors) more in detail. I chose those two groups of themes because they illustrated and answered my research questions most effectively.

Figure 1. Stages of data analysis.



In the second phase of data analysis I conducted detailed analysis of metaphors and data segments of critical events searching for differences across participants. First method of secondary data analysis, the metaphorical analysis (cf. Dacey & Lennon, 1998; Lakoff & Johnson, 1980; Radman, 1997), was a fruitful approach to analyze creativity. The metaphorical research segment presented in this report explored and reconstructed the individual creativity metaphors related to the creative person, product, and process. It also highlighted participants' and my various interpretations of those metaphors. Additionally, my purpose was to write creatively about creativity, to illustrate professors' creativity differently. In another article (Koro-Ljungberg, in press-b) I have conducted a different analysis of creativity metaphors where I investigated creativity in science seen as a game. In addition to the metaphorical analysis I used a

critical incident method (Flanagan 1953; Tripp, 1994) to reduce data and to separate events promoting scientific giftedness from other life-events. I selected events, which I interpreted or professors identified as meaningful for their academic achievement and the development of scientific giftedness.

4.5 Validity in the post-positivist research

Trained in an interpretative tradition, I planned to conduct a good and valid study. Techniques to improve internal validity (the match between findings and reality) such as using member checks, triangulation, and peer reviewing; searching for discrepant evidence; and including multiple investigators (e.g., Creswell, 1998; Merriam, 1995, 1998; Miles & Huberman, 1994) were part of my research plan. I was initially concerned about external validity or the generalibility of the study. Merriam (1998) and Michrina and Richards (1996) among others suggested rich description, typical categories, and multi-site designs as means to improve external validity. While regarding the reliability concerns of my research I was prepared to answer by justifying my positions and biases and by explicitly explaining my thoughts throughout the research process. The audit trail (e.g., Coffey & Atkinson, 1996; Merriam, 1998) would make it possible for other researchers to conduct replication of my study.

Based on previous validity claims during the research process I used member checks, utilized triangulation from various data sources, wrote notes full of thick description, and explicated my biases. For example, I asked participants after each interview to reflect on and to express their opinions and thoughts about their interview and questions. Some professors found the interview and the study useful and interesting. Leena, for example, appreciated the conversational nature of interviews, which helped her talk more freely about her experiences. She explained, “It was pleasant to talk about these things because rarely I will share these issues with anybody else—not even with my husband.” Likewise, Eija believed that “questions were nice and easy, related to everyday life”. Reijo thought that research was good and questions were thorough. “Also I was able to get something for myself from this. I believe this is beneficial and useful for many. It is interesting to know about others.” Conversely, some professors did not necessarily like the structure and the format of the in-

terview. Keijo noted that he found the open-ended structure too intuitive, and Simo stated how most of the questions "had an idea behind them".

Some scientists gave me advice and guidance about analysis and interpretation. Ville found some questions difficult to answer because "words can be interpreted so many ways. Words also limit the communication." Jari suggested the use of categorizations to promote deep analysis. He had also noted the dilemma of defining giftedness. Mikko, in his turn, referred to the collective nature of giftedness and replied: "Questions were rather good. Just remember not to emphasize too much individual aspects of giftedness. I have not been here alone." Seppo concluded: "This [interview] was more sophisticated than I thought."

Kirsch (1999) was concerned about the ethics of representing others and suggested researchers to allow participants to engage into interpretation processes by negotiating interpretative conflicts, textual representations, and use of personalized data. Therefore, in addition to the instant feedback received directly after the interviews, in the spring of 2000 I sent article drafts to the participants through email. I asked them to comment on the drafts and to point out possible mistakes or misconceptions of interpretations of professors' life events or experiences. One third of professors in this study engaged in the interpretation process and thus affected the ethical and informational changes that I made in the manuscripts. Some of them wanted to change or to delete some life-history data such as dates, places, or too sensitive events. Some of them wanted me to clarify concepts or interpretations. Others only replied to let me know that they agreed with what was written.

After I had completed all previous requirements to increase the validity of my study and read participants' responses, I concluded how individual and situated the evaluation of this study appeared to be. Some participants agreed with my interpretations; most of whom had supported and valued my study from the beginning. Other participants who thought that this study would never uncover the true faces of giftedness or capture the realities of their lives stood behind their arguments even after reading my initial data analysis. Still I believed that I had conducted an important study. In relation to their responses, I returned to the books to find out what is validity, and how to approach or to reevaluate validity in the poststructural world?

I found out that validity after positivism has been reevaluated and reconstructed. Scheurich (1996) noted how "validity is the name of the policing practices that divide good research from bad" (p.53). Merriam

(1995) explicated the importance to understand the particular in depth, rather than to generalize. Denzin (1989) explained that he would replace truth and validity with authencity. In his words, "the validity and adequacy of an analysis is assessed in terms of the researcher's ability to account for and explain how a subject's definitions are produced" (p. 55). After reading previous statements of validity in qualitative research I became interested in questions such as what lies behind the primary themes (e.g., themes related to the critical events) of my analysis? How did critical events come into being? And, if phenomena are created through language is there any "true" criteria for validity?

Instead of traditional concepts of validity Richardson (2000) preferred the idea of reflexivity. Anderson and Herr (1999) indicated the need for outcome and process validity, where steps toward resolution of the problem were to be evaluated. Anderson and Herr (1999) valued collaboration and multiple perspectives as a sign of democratic validity. "Goodness" of research in their terms was monitored through peer reviews, which added to a study's dialogic validity. Scheurich (1996) also encouraged the creation of dialogue between researcher and the "Other". Denzin (1997) and Merriam (1995) transferred text's validity claims to the reader. To their way of thinking, a text's validity claim is not anchored in the so-called external world but the readers validate texts based upon their own experiences.

Scheurich (1996) desired to unmask validity and its connections to external world. He stated:

> New imaginaries of validity need to unmask and undermine the dualistic regularity that unknowingly shapes our validity practices across the different paradigms. On the other hand, these new imaginaries need to highlight, support, and celebrate polyphony, multiplicity, difference(s), and the play of the Other. These new imaginaries need to reconstruct 'validity' or 'truth' as many sided or multiply perspectival, as shifting and complex. (p.56)

Lather (1993) spoke for ironic validity, which would produce truth as a problem and take interpretation problems and crisis of representation into account. Her concept of paralogical validity fostered differences via purposeful interruptions and rhizomatic validity confirms the "conventional discursive procedures", which are problematized. (p.686) Based on previous post-positivist argments, I believe that the warranty for scientific validity is lost and methodology and criteria of evaluation have to be questioned (Gergen & Gergen, 2000). Therefore, the most accurate means for

evaluating the validity of this alternative text is Richardson's (2000) criteria for validity in creative analytic practices. Richardson postulated that in the review of alternative texts the following issues should be considered:

a) Substantive contribution (e.g., does the piece contribute to our understanding of social life?),
b) Aesthetic merit (e.g., does the text open up the text and invite interpretative responses?),
c) Reflexivity (e.g., how did the author come to write this text?),
d) Impact (e.g., does the writing affect me or generate new questions?),
e) Expression of reality (does the text embody a fleshed out, embodied sense of lived experience?) (p. 937).

Her criteria are met by this study in the following ways:

1. Situated and multilayered interpretations contribute to understandings of scientific giftedness.
2. Troubled interpretations and texts (e.g., Research segments invite alternate interpretations and do not claim one interpretation to be the final one.)
3. The research process and the researcher's actions are described in detail.
4. The refusal of "one, true" closure leaves space for new questions to emerge for future research.
5. The data segments provide evidence of fieldwork.

Beyond Richardson's criteria, the validity of this study can be evaluated by considering if the various levels of interpretations and the depth of this analysis promote democratic validity. Does the analysis illustrate multiplicity? Is it clear how scientific giftedness in this study was produced, or how the researcher supported her claims? How was the crisis of representation taken into account? When evaluating the validity of this data analysis and represention, readers and other researchers have to keep in mind the ontological and epistemological assumptions of poststructuralism. If there is no true, single, universal external world, validity claims that require texts to reflect and imitate reality have to be reconsidered.

Additionally, poststructural conceptions of validity combine epistemology and methodology with ethics. Pillow (2000) questioned the relevance of validity in a poststructural spirit, asking "Generalizability, validity, and reliability for whom." She continued to wonder: "Are research-

ers constructing validity and reliability discourse for themselves, for the subject, for the reader or for the field." (p. 23). Kleinsasser (2000) and Lather (1993) proposed that reflexivity reformulates the ethical approaches of research reports and addresses some concerns of speaking for others. Researcher's reflexivity makes the ethical choices and ethical tensions of research visible.

In the following sections, I present three research segments and three data examples to answer the research questions and validity claims of this study. The data and data collection methods stayed the same throughout every segment, but poststructuralist orientation within data analysis and representation was practiced slightly differently in each segment. When I combined all of the segments, this report became layered and illustrated the thematic similarities and differences. The data examples in the research segments are parts of more detailed data analyses, which are presented in the original articles. Parts of the first two data examples are represented as they appear in original publications to provide the reader with a more complete picture of the alternative data presentations employed. Due to the limited space and format of this report, the research fragments presented are less detailed than the journal articles from which they are abstracted. I suggest that those interested refer to the original publications to ascertain a more comprehensive version of these alternative data presentations.

5 Research Segment of Metaphors

5.1 The purpose of first segment: Multilayered texts illustrating complexity of creativity

The purpose of this segment is two-fold: to illustrate the professors' creative processes through metaphors and to describe how the complexity of qualitative data changed the nature of this research and created multilayered interpretations of creativity. The following segment is more methodological in nature and addresses epistemological issues of multiple realities and situated knowledge. The three different sections of this research segment (meta-story, academic story, personal story) are interwoven in order to illuminate different perspectives and alternative interpretations of the scientists' metaphors. I provide examples of how metaphors, related to a life history context, "extend horizons of insight and create new possibilities" (Morgan, 1997, p.351) for viewing the role of the participants, the researcher, and the creative processes of the scientists. Metaphors of an ameba, a puzzle, a growing plant, a seine net, the creative gear, and a sheep dog are extracted from the interviews of two professors (Sakari and Reijo) who were the most metaphorically productive during their interviews and who illustrated the complexity and multiple meanings of creativity in descriptive ways. Metaphors from Sakari and Reijo were also chosen because they illuminated themes of creativity among all Academy professors and pointed out the core dilemma of creativity found in this study: every creator had various situated meanings of creativity.

"The uncertainty about adequate means of describing social reality" (Marcus & Fischer, 1986, p.8) and the multiple discourses of creativity (i.e., the various theories, conflicting and individual data, and the rigorous opinions about creativity) prompted me to question the certainty of the "category of creativity." A crisis of representation led me to alternative ways to represent data (cf. Blumenthal, 1999; Lather & Smithies, 1997; Kirsch, 1999) and provoked the creation of a multilayered story. Diverse metaphors, which traverse through this segment, displayed the differences and the pluralistic nature of creativity in constitutive ways. I exercised an agency of alternative interpretations (Blumenthal, 1999) because I was not convinced that I, as the researcher, solely owned the authorship or

control of the text (Borland, 1991). I desired to honor the multiplicity of stories that informed my research.

The research segment of metaphors is constructed from three story layers that both display and frame these data. In the Academic story (presented in normal font), I situate myself within the academic discourse of research methodology and gifted education and focus on the paradigms, metaphors, and issues related to scientific giftedness, creativity, and qualitative research. Readers can live through my **Personal story (presented in bold font)** in which my supporting, and sometimes confusing, thoughts encompass the description of the research process. The personal story is integrated into the academic story and the meta-story simultaneously providing another layer of text. In the "Meta-story" I provide data examples of metaphors and my interpretations of them, relating metaphors to the previous research of creativity. At the same time, realizing that my conversations with these scientists might have lacked a common language to talk about creativity since creativity meant something different for each of my participants (cf. Scheurich, 1997), I question my primary interpretation and leave the reader with controversial questions. I wonder aloud where I have not gone with my interpretations (Glesne, 1999). I call those unresolved conflicts ***'Or-questions' (presented in bolded italics)*** that could lead to completely different interpretations.

5.2 Defining creativity

Many studies of creativity begin or conclude with "the" definition of creativity, but I was bothered by certainty about "the right" definition. The definitions seemed well grounded to the data and had one thing in common: they were all different. They were fiction in the sense that they were "something made" (Greetz, 1973, p.15), texts which were created (Cosgrove & Domosh, 1993) and descriptive of one reality, the reality of the definer. For example, Amabile (1989) posited "the creativity intersection" with three components: domain skills, creative thinking and working skills, and intrinsic motivation (p.63). Feldman, Csikszentmihalyi and Gardner (1994) related creativity to individuals' capabilities to change the world. They defined creativity "as the achievement of something remarkable and new, something which transforms and changes a field of endeavor in a significant way" (p.1). Csikszentmihalyi (1996) himself developed those thoughts further and approached creativity in its relation to

the field and domain. “Creativity is any act, idea, or product that changes an existing domain, or that transforms an existing domain into a new one” (p.28). Martindale (1989) believed that “all factors (cognitive, special talent, motivational, and situational factors) must be present if a person is to be creative” (p.214). Whereas Rogers (1988) emphasized the novelty of the creative product and individual thought, which interact with the environment in various ways. Instead of focusing on creative products, Wallas (1988) became known for his four stages of creative process: preparation, incubation, illumination, and verification.

It seemed to me that the previous definitions may have captured the reality of a creative process among some creators, and further definitions described creativity among others. It appeared as if different definitions were created based on the researcher’s individual research findings. However, every researcher stated his/her definitions in a similar fashion, which employed the idea of sameness or aimed towards generalization purposes (this is my personal story layer). Instead of synthesizing other’s definitions, researchers more likely created their own definitions. Some of the researchers emphasized, for example, various cognitive skills, motivational aspects, social factors, problem solving processes or the “originality” of creative work. While the definitions of creativity elucidated certain aspects of creative encounters, rarely did the researchers state the philosophical assumptions constructing the concept of creativity or trouble the taken-for-granted assumptions related to the terminology they used. Nevertheless, some alternative approaches and critical arguments can be found in the creativity research. Brown (1999) proposed an exceptional example of a poststructuralist critique in which he utilized and questioned the definitions created by other creativity researchers and problematized the concept of originality. “Expression is never free of indication: that a content cannot be separated from an element by which content is expressed. As there can be no pure content, there can be no pure expression. Behind every image lies another image” (Brown, 1999, p. 424–425). Therefore, there will be no “originality”. Similarly, Parkhurst (1999) questioned the novelty requirements of creativity by asking about the degree and evaluation of novelty, and Nickerson (1999) refused to identify the set of creativity determinants in the first place. **These critical thoughts supported my representation of creativity through alternative, situated, and temporal metaphorical illustrations and bolstered my aims to generate a creative, poststructural critique towards stable notions of creativity.**

5.3 Metaphorical realities

The word *metaphor* comes from Greek *metapherein* (meta = beyond, pherein = to bring). A metaphor creates a relationship between the "Self" and the "Other", forming realities where "understanding and experiencing one kind of thing in terms of another" (Lakoff & Johnson, 1980, p.5) becomes possible. They can be used to close down and summarize phenomena, as Radman (1997) described, when one element is used to represent the whole (Jackson, 1989). Metaphors may also be used to open up and to create new, multiple directions or to bring concepts together (Luborsky, 1998; Morgan, 1997). The means of using metaphors in this study are mainly productive and function to unfold definitions of creativity and descriptions of creative encounters. St. Pierre (1997b) reframed and replaced metaphors in her work with the concept of *figuration*, which emphasizes the unfolding function and therefore distinguishes itself from the summarizing metaphors. Figuration is a tool to "free oneself from oneself, in thinking differently" (St.Pierre, 1997b, p.407). Additionally, Radman (1997) postulated that metaphors make cognitive shifts and scientific reasoning possible. Metaphors can be used productively to construct our realities and create new meanings, which are in the process of constant movement and are "parallel to [the] growth of knowledge" (Radman, 1997).

I use metaphors in their broader sense as multifaceted, situated, based on lived experiences and already known. Allison, Beggan and Midgley (1996) confirmed the importance of metaphors and postulate further that metaphors fit well with social research because no single explanatory mechanism is able to capture the complexity of social dilemmas and because they help to transcend disciplinary boundaries of problem solving. Richardson (2000) explored and used a metaphor of "crystal" to define triangulation in postmodern terms to show that there are more than just a few sides from which to view the world. She explicated triangulation through the concept of a crystal, but also illustrated how metaphors illuminate the multiple sides of the phenomenon to be explained.

Hopefully metaphors in this segment will provide readers with multiple insights that may challenge conventional views of gaining a "true understanding." As some theorists postulate, metaphors have different meanings to all of us, creating a "partial understanding, but hiding other aspects of the concepts" (Lakoff & Johnson, 1980, p.12). **Can we ever gain more than a partial understanding? As illustrated through lan-**

guage, the realities of the creators are always partial. "In creating ways of seeing, metaphors tend to create ways of not seeing" (Morgan, 1997, p.348), simultaneously creating similarities and differences. Richardson (2000) was concerned with other limitations of metaphorical work in which "the sense making is always value constituting –making sense in a particular way, privileging one ordering of the "facts" over others" (p.927). Within this study, the complex set of diverse values and experiences drawn from the examples of two Academy professors, who did not reach consensus about their own creativity even inside their own stories, directed the interpretations of the metaphors. The interpretations had to be problematized "because so many of the concepts that are important to us are either abstract or not clearly delineated in our experience (the emotions, ideas, time, etc.)?" (Lakoff & Johnson, 1980, p.115).

In the process of thematic sense-making and theory-building, metaphors stood out from the narratives because of their richness of language, practicality, and capability to communicate (Leary, 1995) and because they captured certain moments and feelings. "Metaphors enable a new way of seeing and add a new dimension to a term we might not otherwise think in that light. It gives a richer feeling" (Atkinson, 1995, p.24). Just as Eisikovits and Buchbinder (1999) analyzed metaphoric structure of violent events and found that metaphors helped to capture the personal and interpersonal contexts associated with them, metaphors enhanced my and the scientists' situated analysis of creativity. The participants created all of the following metaphors. In order to trace the context from which the metaphors arose and to which they related, I provide additional details and information from the scientists' life stories to support my interpretations. My intention in this writing is to uncover the connection between diverse realities of my participants and the existing theory of creativity and giftedness.

5.4 Data example: Meta-story

For Academy professor Sakari, the creative process was a significant part of a scientist's work. Nevertheless, he stated that the process was "hard to control," almost an "ameba" who changes its form and appears in different shapes. Sakari described how hard it was to predict when and in which form the creative ideas will appear, but he found it helpful to communicate with other people who were struggling with similar prob-

lems. This is one interpretation of his experience and his words, but I can challenge my primary thinking and formulate another interpretation that might be as accurate. ***Or: Could 'ameba' signify something undesirable? Does Sakari feel himself powerless sometimes when creating? Is it possible that he would like to control his creativity and be aware of what will happen next? Could 'ameba' be interpreted as slimy or hidden? Could 'ameba' be understood in dangerous ways?***

Sakari's creativity implied cooperative environments and communal initiatives. His creative process required exchanging thoughts among students and domestic or foreign colleagues. Creativity researchers Walberg and Stariha (1992) stated that the "developmental histories of creative people suggest that voluminous productivity, sustained effort and stimulating mentors and peer groups promote talent" (p.335). Sakari also perceived the creative process as a puzzle or a growing plant. In the puzzle metaphor, he referred to the situation where someone else has "tried to put the scientific puzzle together earlier" but has not succeeded. His task was to "find the critical mistake, or contradiction" and finish the puzzle. The research about scientific discoveries also draws upon that notion. Kuhn (1996) used a puzzle metaphor, "the puzzle that no one has solved before" (p.38), to describe scientific work. As well, Hägglund (1984), Kubie (1988) and Roe (1988) postulated that creative people are able to see contradictions and adapt multiple lenses. Disorder makes them feel uncomfortable, and they have a need to achieve order and balance. The missing elements are found, and new meanings are created. While solving the scientific puzzle, Sakari related himself to other scientific communities and also to previous knowledge within the domain, using the existing scientific discourse to create novel ideas (Walberg & Stariha, 1992). ***Alternately: Could the puzzle metaphor refer into an impossible task? Could Sakari mean that the creative task is sometimes impossible to solve?***

Sakari expanded the concept of creativity even further. He explained that the "growing a plant" metaphor described the essence of creativity as a complex but flimsy and delicate process, where luck might play an additional role. When solving the problem, he collected seeds from readings, conferences, and professional discussions. Scientists planted all the seeds in the nutritious soil, but unfortunately, some of the seeds did not grow even if the research team watered and nourished them well. After Sakari had completed all the preparation of the problems, the incubation time followed (Wallas, 1988). The ideas had to germinate. ***Or: Could***

another interpretation explain Sakari's thinking as well: Can creativity be perceived as a part of natural human development wherein neither special characteristics nor circumstances are needed? Could creativity occur with all of us in certain times of our lives?

Creativity prompted many metaphors in Reijo's interview as well. Reijo began with describing a creative person's sense to smell the most interesting and valuable problems. "A person has to become aware of what problem is worth sixty-four-thousand-dollars and what problem is worth only one dollar." Walberg and Stariha (1992) argued, that a creator has to be alert to novelty and knowledge gaps, while Kuhn (1996) articulated that scientist have "the hope of finding order, and the drive to test established knowledge" (p.37). Csikszentmihalyi (1996) pointed out the importance of selecting successful ideas. Reijo continued:

> Some people just do not understand what is important and what is not. Creativity starts when I am able to structure the problem space. I am able to picture and guess what I am looking for. The creative process is like clearing the messy seine net [author's note: a seine net is a large, small hole fishing net, made out of light, silky material. Seine nets usually get twisted and tangled, and fishermen need a lot of time and room to clear it]. I can not tell where to start exactly, but I have to have a vision.
> ***Or: Is Reijo 'getting lost' during/in his creativity? What if he does not have a vision? Could he be lost even he had a vision? Lost for a while?***

Comparing creative problem solving to a messy seine net provides insight into the uncertainty of the creative process. It is partly intuition, the unconscious processes (cf. Dacey, & Lennon, 1998; Gnezda-Smith, 1994) that combine with vision and knowledge, that helps fishermen to untangle messy, snarled nets and professors to solve complex problems. However, trust and psychological safety (Rogers, 1988) constituted a major starting point for creative work. Researchers like Reijo have strong self-confidence and a belief about the appropriate approach to the problem that will get them closer to the solution.

Unfortunately, in light of productivity requirements of the modern era, vision and insights do not occur everyday. Reijo described the irregularity of ideas as having a "creative gear." When the creative gear was engaged, ideas cropped up into the consciousness, and he felt productive and his mind and thoughts "ran as an engine." But there were days when ideas did not come. ***Or: Is a creative process something unnatural and thus comparable to machines? What if creativity is created***

outside of us? Is creativity a linear process starting with input and ending in output? Or can creativity be constituted just from one stimulus, single input or output?

As he said,

> I need a stimulus, which can come from various sources. You cannot force ideas to occur. They come themselves if they want to. Many times I am unproductive, just waiting for an idea to come. Do they come or not? They do not come. [**Tolerance of ambiguity**, see Dacey & Lennon, (1998)]

Luckily, in Reijo's case, unproductivity was usually not a problem. He is a good example of very creative scientist who simultaneously had many ideas and projects in progress. In Csikszentmihalyi's (1996) study, biologist E.O. Wilson also reported having many ideas simultaneously. Reijo continued: "I think that my problem could almost be that I have too many ideas. It is like being the sheep dog, whose sheep run into many directions, and it is hard to keep track of all of them at the same time." Reijo wanted all of his sheep to come back home; likewise, he faced an urge to bring all his ideas into fruition. Knowledge about where his ideas could lead and what he could achieve with them reformed his thinking. On the other hand, lack of time and unwillingness to give up any of his ideas led to chaos. He seemed to realize the situation and ended up by saying: "An idea is just a beginning, one chance to succeed." ***Or: Is Reijo hopeless about his creativity? Can something creative be restrictive and oppressive at the same time? Can creative situations make him nervous and uncertain about himself or others?***

5.5 Concluding first research segment: Creativity as a crystal or a collage

As participants used metaphors to make sense of their creativity, I similarly utilized metaphors of crystal and collage to interpret their experiences. Creativity can be seen as a "crystal, which combines symmetry and substance with in infinite variety of shapes, substances, transmutations, multidimensionalities, and angles of approach. Crystals grow, change, alter, but are not amorphous" (Richardson, 2000, p.934). Creativity as a crystal contributes to the domain knowledge of gifted education, but it

also demonstrates how I viewed creativity in a methodological sense. For example, these scientists explored a variety of ways of seeing creativity, and they described changing forms of creative processes and the effect of these forms on their work. Various definitions and explanations of creativity connected to different times and places, illuminating different sides of the crystal. Sakari and Reijo offered six explanations of what creativity and the creative process meant for them. Creativity required curiosity and a search of hidden (Hargreaves, 1990; Roe, 1953) but also detailed problem solving activities (as illustrated in the metaphor of a puzzle). It was hard to control (an ameba) but also had predictable stages (a seine net). It was nourished in the intellectual climate (a growing plant), but for many professors, the incubation stage was mostly a solitary process (a creative gear). Creativity had playful elements (a puzzle), but made scientists feel uncomfortable or sometimes even helpless (a sheep dog). It required vision and persistence (see e.g., Roe, 1953) (a growing plant) but sometimes illuminations appeared suddenly (a creative gear).

In the metaphor of creativity as a collage, the layers of the creators' characteristics, processes, and products became impossible to separate. It was difficult for the scientists and for me to distinguish when creativity was due to collaborative or solitary efforts, which stage of the creative process contributed most to the insight, or what types of products (i.e. proposals, articles, books, patents, or inventions) were most creative. All of these elements were part of the scientists' creativity. A good collage has depth and creates a temporal spatial illusion in which all of its parts can be rearranged to create other illusions. Different combinations of the creators' characteristics, stages of creative process, and goals of creative productivity require new metaphors, which describe novel, unique constructions of creativity. All of the scientists' metaphors, in addition to my metaphors of crystal and collage, implied that creativity is unstable, situated, and transmuting, thereby supporting Isaksen's (1987) notion of creativity as a multifaceted phenomenon.

In the methodological sense, metaphors are a new angle of approach, another side of the crystal, a rearrangement of the collage's parts, and/or a deeper insight into the creative processes of Academy professors. Even after creating a multilayered text or distinctively different versions of reality, as I illustrate through the academic, personal, and Meta-story, I cannot be sure that I have truly captured "The reality" of what it means to be creative. I could even agree with Hausman (1987) and question if creativity is a linear concept at all. Instead, I ask the following methodo-

logical questions: Where creativity is (Csikszentmihalyi, 1996)? Would it be useful to examine how creativity differs from itself, from its label or its assumed meaning? Can we utilize multiple narratives and metaphors to gain situated understandings (Van Maanen, 1995) and ask "how creativity is?" Or do the similarities of creative encounters have different meanings for every individual and does there exists no "neutral translation of [creative] reality" (Cary, 1999, p.416)?

6 Research Segment of Critical Events

6.1 The purpose of second segment: Critical events producing similarities and differences in scientific giftedness

The purpose in this segment is to demonstrate the various paths to scientific success by illustrating the situatedness and individualistic paths of scientific achievement and by connecting and reconnecting issues of time, place, and power in various ways. This segment addresses the second domain-related research question with which I investigated the elements during the scientists' life-span that affected giftedness and academic success. In addition, it illustrates the kinds of knowledge produced from an analysis of critical events.

Critical events, which are traced from interviews and curricula vitas, are presented in tables, which are followed by my thematic interpretation of the professors' events illustrated in researcher's stories. Data from the "Gatekeeper" and the "Professional leader's" life stories described the primary report theme of sameness but also promoted meanings created through differences. The "Gatekeeper" and the "Professional leader" exemplified different constructions of professional and personal lives that both led to academic success. The descriptive themes such as mentors, academic years abroad, deep interest into the domain, and luck were produced by the first phase of critical incident analysis using data from all 26 professors. In the second phase of analysis, I studied why those themes promoted success and consequently theorized the existence of two transformative themes: a situated construction of an academic career and reflectiveness.

6.2 High achievement connecting to creativity and success

According to Hunsaker and Callahan (1995) creativity can be seen as part of giftedness, and Gruber (1982) proposed that researchers cannot look at giftedness or at achievement without also looking at creative processes

among adults. For many Academy professors, the creative process stimulated thinking, assisted in maintaining a prolonged interest in the same project, and promoted their success. The role of creativity in promoting one's career became evident in the professors' accomplishments and desires to create their own domains, departments, and novel lines of research. At the same time, they moved "beyond the original domains and connected different domains with each other" (Csikszentmihalyi, 1999, p.16). The scientists' stories reinforced Innamorato's (1998) notion that when arts and sciences merge intuition and imagination becomes possible and visible. Not all creativity researchers believe in the role of creativity in producing innovations. For example, Weisberg (1999) postulated that creativity does not necessarily promote innovativeness but that successful persons know more and the difference in productivity can be explained through general theories of thinking. I add to this inquiry and ask several questions: Why did the scientists know more than their less productive colleagues? Is it due to the expertise, practice, and effort as Ericsson (1998) postulated? Why were they able to utilize their knowledge in productive ways or to maintain their interest long? And how did creativity and problem solving impact their success?

Success in science as presented in this study was defined as a balance when professors were satisfied with their production input, effort, output, and/or result. Gardner (1997) postulated that success became possible after a domain recognized a person's contribution to the domain and rewarded him or her. Bloom (1985), Filippeli and Walberg's (1997), and Piirto (1998) suggested that, in order to become successful, a person had to work hard and have a strong interest in a specific area, an emotional commitment, a willingness to reach high on one's abilities, and a willingness to invest time and effort. Simonton (1994) suggested studying both "early and late bloomers" to find out their potentially different developmental paths where the inventory of crucial developmental events could be useful to trace the external circumstances affecting talent development from birth to death.

Sternberg (1996) uniquely combined success and giftedness and introduced the term successful intelligence as a "kind of intelligence used to achieve important goals" (p.12). Successful, intelligent people use their strengths and weaknesses in constructive ways. Additionally, they know their capabilities and limits and do not hesitate to ask for help. Sternberg (1996) defined successful, intelligent people in the following ways

- They have their own path and pursue that path even when obstacles arise.
- They have a "can-do attitude".
- They learn from other people's successes and failures.
- They have mentors.
- They modify and shape their environment and look for successful situations.
- They see "intellectual abilities as dynamic and flexible" (p.12–33).

6.3 Critical incident method

In this segment critical events are used to interpret and to retell the lives of the Academy professors by rebuilding themes of their lives around critical events. I elaborated and analyzed the "events that are critical, influential, or decisive" (Miles & Huberman, 1994, p.115) to the scientists' scientific achievement. A critical incident method, therefore, is capable of "producing an ongoing and discontinuous account of fragments of the past" (Tripp, 1994, p.65).

Flanagan (1953) was among the first to use critical events as a technique to analyze human behavior. He showed how a critical incident technique was useful in collecting and in studying important facts related to specific and defined situations. Richardson (1995) illustrated ways how critical events constituted the meaning of a narrative, and Denzin (1989) examined how lives are constructed through and turned around by critical events. The constructions of meanings or the description of the transformation of one life event to another was the main goal of the method of analysis used in this study.

During the individual interviews, I did not explicitly inquire about critical events of the participants' careers as scientists or in their development of scientific giftedness. But in the data analysis I used critical events to reduce the amount of life history data, focusing only on those events that had the strongest influence on the professors' high achievement. The critical events I analyzed were considered central and key turning points (Coffey & Atkinson, 1996) if the participants mentioned them as having an impact on their achievement or if they were mentioned in their curricula vitas as a part of scientists' professional development. Within the critical incident method I conducted analysis of themes first in a descriptive and later in a transformative manner. As the result of de-

scriptive analysis, I identified themes that were common for all the stories told.

In the secondary level of analysis, I challenged the primary, descriptive themes and findings and produced transformative themes, which helped me to reconnect the primary themes and professors' lives differently. The secondary analysis did not aim to provide generalizations beyond the stories portrayed but rather to concentrate on the differences, to emphasize situated knowledge, and to illustrate various ways to achieve success. In this report I chose the critical events of two professors, "Gatekeeper" and "Professional leader" to illuminate the variety of experiences and strategies of success. "Gatekeeper's" pseudonym was created during the data analysis process and represents a classical researcher and a gifted researcher who through guidance and mentoring became a gatekeeper himself. Additionally, "Professional leader" was chosen to emphasize the cooperative approach to success, which was common among many professors as well.

In the following, both exemplary stories are constructed on three different levels. First, the actual critical events are presented in tables where events are supported with the quotes from the interview. Second, each researcher's story illuminates primary themes and my interpretation of those themes. Third, reflective accounts of transformative themes connect to data examples and theorize secondary themes. To be able to present a more holistic picture of data analysis, the table and each researcher's story are reprinted from the original publication, but the secondary analysis has been modified and abbreviated.

6.4 Data example

6.4.1 "Gatekeeper"

Table 2. The critical events of "Gatekeeper" and the reference to his interview.

	Critical event	**Quotes from interview**
1941	Birth	
1945	Having to read early	"I was considered gifted when I, at the age of four, started to read. I read all the books, which we had at home…I think my scientific giftedness was based on that." p.11
c. 1950	Doing scientific experiments	"Between the ages of 10 and 12 people usually start to get interested in how machines work and how natural phenomena occur. Half of the American scientists did chemical experiments and built radios when they were young, and I did both too." p.5
c. 1952	Participating in language studies at school	"Another thing that made international success easier was my wide interest. I had seven years of studies in Latin and other languages. International cooperation worked well because I was able to speak well." p.6
1952	Being unsuccessful in school	"My giftedness disappeared for a while. I hardly passed the grades, and I was interested in other things. Later, I also studied during summers in order to pass my grades." p.11
1953	Having a conflict with his writing teacher	"I had linguistic skills, and I wrote nice short stories. In the third grade my teacher started to give me fours (grades from 4–10. Ten is the highest) and told me that I had to start to write formal text. I learned. …Maybe it was the most valuable thing that I have ever learned." p.16
c. 1955	Being president of radio amateur club	"As a minor I was chosen to lead the club of radio amateurs. I learned how to communicate, to be social, and cooperate. That specific time spent in the hobby increased my capability to understand English and added to the knowledge of how to build electronic equipment." p.11
1962	Getting into the top research team	"It was my first engagement into the research work." p.3
1964	Getting a Master of Science	"Teachers at the university were not necessarily the most intelligent, but they were good teachers. It was a excellent place to grow." p.12
1967	Getting a doctorate in philosophy	"After I graduated at the age of 25, while still very young, I started my own (scientific) path." p.12
1968–1969	Spending a year as a scholar in England	"I traveled to London where I was able to deepen my knowledge and to connect various sources of information in my domain." p.3

Table 2 continues

Table 2 continues

1970	Participating in an interdisciplinary course	"Luckily I participated in a course dealing with interdisciplinary work. My teacher, Panari, was a character, a young American doctorate who taught us through the basics of the domain." p.4
1972	Cooperating on a symposium with Dr. Monte	"I have always been good at organizing, and I invited him (Dr. Monte) to Finland for the symposium. He agreed to participate, and we decided to start cooperating." p.4
1973	Lecturing abroad	"I went abroad in 1973 with my family and started a new program at the local university." p.4
1974	First findings with Dr. Monte	"We calculated our findings mechanically by using new theory. No one had ever done that before. Those were the first classical results of ours." p.4
1975	Getting primary scientific insight	"I don't know what transferred from 1975's insight into those 9000 works that were created from that insight." p.5
1984-	Obtaining professorship	"I have taught the most basic courses of my domain two times. During the second time, I went through the basic tables and started to imagine how tables would continue beyond the present knowledge. I started to work with similar combinations by counting if new kinds of combination could exist. Those findings have lead to many publications." p.21
1991	Having too many official and unofficial positions	"Work days became long. I was in the Academia from 9-5, then I went to the lab, did my own research, and took care of communications with others. There was nothing more than work and sleep. It was stressful situation but some of the responsibilities and duties just disappeared and things changed." p.26
1992-1998	Becoming chairman of SIGMA	"Me and Dr. Monte could be called as spiders in the net, taking care of the projects, administration, formally and content wise." p.2
1997	Being scientific board member in international organization	"They did not pay you, but you got information. While being a board member I saw where and what was done in the field. It was valuable." p.10
1995-2000	Receiving Academy professorship	"That was a very quiet and lovely time. I really valued the Academy professorship. It was the highest academic position in Finland." p.14, 26

6.4.1.1 Researcher's story of "Gatekeeper"

The beginning of academic achievement.

Jukka started to read at the age of four and began first grade at the age of five. The early start may have been an advantage later in his career when

he accomplished many academic achievements earlier than his peers. Jukka perceived his scientific giftedness closely related to the academic achievements. As a teenager, he confronted some problems at school that may have been motivational. He explained that those problems could have been related to his early start and to "being the youngest". He named that time as a period when "giftedness disappeared for a while." Jukka described his home as supportive, a usual working family without any academic degrees where "the driving force was not a long academic tradition at home, but a total lack of it."

Jukka emphasized the meaning of hobbies to his career development. For example, he was always interested in science and found other children with whom to share his interest. He learned many principles of the domain just by doing experiments and by playing in the garage and with nature. Studies of foreign language at school, which were not very common among his professional colleagues, were useful for maintaining international connections. Also, being a member of a radio amateur club taught him English and many principles of electrical equipment. All of the skills gained through hobbies were useful in his career and supplemented "the most important thing he learned at school", which was writing formal essays.

Engagement in the domain.

Jukka was not educated in the most respected university in Finland, but he remembered his teachers having good teaching and mentoring skills. During his doctoral program he worked hard and long hours. He reflected on how he was able to "finish the dissertation fast because of the previous experience with English and electronics." Jukka was deeply involved in measurements and scientific experiments in the lab, and he realized that by working around the clock he would receive better training and education. He explained: "I trained myself to become a rather good professional." After completing his dissertation he felt he had enough knowledge and skills to pursue more of his own interests and to establish his own line of research.

A need for international experiences.

Years abroad helped Jukka gain an international perspective and a variety of experiences. In his profession Jukka felt isolated professionally from international scientific communities due to the size and physical location

of Finland. It was useful to become familiar with international research done in his field, to learn various research techniques from foreign laboratories, and to network with other colleagues. "America was more dynamic, and Europe had more continuity, so it was important to experience both." During the time spent in England, Jukka was involved in developing a new domain and established his preliminary ideas on how to connect two different domains in a new way. After coming back to Finland, he continued educating himself and kept in contact with his new colleagues abroad. "A person must have his periscope wide open in order to find out which of the many contacts can be useful and needed later," he said.

Also due to the isolated location, Jukka decided to invite famous speakers in his field to Finland. After he arranged a famous researcher to come, it was easier to get others as well. One of those arranged visits developed into long lasting cooperative and mentoring relationship. Jukka and Dr. Monte (pseudonym), a famous foreign scientist, connected their deep knowledge of and interest in different domains to create a new domain. Cooperation between those two professionals from different fields led to the fruitful collaboration, groundbreaking findings, and the establishment of a specialized department at the university. In 1975 Jukka had one of his most important scientific insights, which led to many works and publications. He explained that the process of gaining the insight included going through the basic principles of the domain to add deeper knowledge in the more advanced level of problem solving.

Working not just for money.

Being involved in too many positions at the same time, which were to further him in his career, created stress and lead to a situation where he had no time except to work and to sleep. He felt responsible and motivated to pursue his tasks and assignments even when they were overwhelming. Filling many unofficial positions in various research organizations as well as participating in decision-making processes as a member of various scientific boards where he was able to affect the direction the domain was to take helped him to advance in his career. He was able to control the information and to see all the new trends and new directions. Jukka felt that that gatekeeping work had been a valuable and important part of his career. Finally, the Academy professorship gave him a chance

to reflect, to take life more slowly, and to concentrate more on creative work. Jukka concluded, “I had all and more that I deserved in fairness.”

6.4.2 “Professional leader”

Table 3. The critical events of “Professional leader”.

	Critical event	Quotes from interview
1948	Birth	
1966	Obtaining summer job abroad	“I could have gone to medical school as my parents expected, but one year before, I worked in the hospital and saw people die. It was hard and I knew that I could not handle it.” p.6
1967	Compromising career	“I applied to the dental school because I was thinking naively that I could work half days in my own office and take care of the children the rest of the day.”p.4
c. 1967-1973	Having research assignments during university studies	“Why I became a scientist was that I did not like my studies, which were so stupid. After two years everything became too much of a handicraft. It was important that the filling of the tooth shine. Then I asked my scientist dad if he had any challenging research assignments.” p.4
c. 1971	Being part of student activities	“I was active in student organization, where I established many good and lasting relationships.” p.10
1972	Graduating with the experience of international collaboration	“It was the academic tradition of my department. Seminars were taught in English and we had many foreign visitors. The knowledge of science is based on international collaboration.” p.5
1975	Getting a doctorate in philosophy	“My dad was very pleased with my graduation.” p.11
1976	Getting married	“You have to choose a good husband. It is the biggest issue of all. You have to have a husband who is supportive.” p.3
1977	Having first child	“I was able to hire a nanny. I could have not imagined how to survive if I would have taken my children to daycare and did all housework myself. I was not willing to give up more of my private life” p.4
1978-1979	Visiting United States of America	“The best of that year was the establishment of connections. I also saw how work is done abroad. It was the professionalism there that impressed me. It was a place for professional researchers, and we did not have anything like that in Finland at that time.” p.8

Table 3 continues

Table 3 continues

1980	Founding own laboratory	"I founded my own laboratory. I was totally alone. Nobody was interested in my research except my students. I had to keep in contact with other researchers so that I knew what was going on in the field. Cooperation was crucial. Then my research group grew little by little."p.8
1983	Specializing in the growing area of research	"I was lucky to choose this domain. The developmental research exploded during the last ten years and nobody was able to predict that. I got a really good start because I had all the basic knowledge already." p.5
c. 1983	Losing the job competition	"Due to the fact that I was a woman, it was planned to make me lose one job competition. One male applied for that job also and other professors in the field wanted him. He did not have many academic credits but he got the job. One of my friends notified me about that. It bothered me." p. 20
1990-	Obtaining professorship	"Then my problems started. I was female in my forties and almost the only one in the institute who was a serious researcher. Other colleagues could not handle it when I did not want to do what they asked. They were not supportive and did not understand my strange hobby: research." p.3
c. 1994-1999	Receiving Academy professorship	"I did not even apply for the professorship. Everything was fine with my career, I earned enough money and so on, but the application committee asked for my application. I wondered 'Why should I try to get everything for myself? I did not have a need to prove anything. I knew that I was quite good." p.15
1996-	Working as a research director	"This was totally new, the whole building and so on. I applied for the job and got it. I could not imagine that this kind of paradise existed." p.5

6.4.2.1 Researcher's story of "Professional leader"

Support from various groups.

"Professional leader" lived all of her life in a good, nourishing and supportive environment. Leena had supportive parents, and later she had an encouraging spouse. "It could not have been better." She realized that she was "born with a silver spoon in her mouth," but she did not use her position to gain success even though she could have. "I had about all that I wanted. I had never used anybody to achieve my goals, nor called anyone for help or played dirty games. I had a principle that all that I accomplish must be due to my own effort. Otherwise I could not have forgiven my-

self." Leena explained how having academic family background is not enough: "My sisters did not become researchers even though they had the same background." Leena had neither an early interest in the domain nor long-term career plans until she found ways to connect both family and career aspirations. Without financial security and outside help from nannies, housekeepers, and neighbors, building her career and having children would not have been possible.

Being a role model for her students.

Many times during the interview Leena emphasized the importance of cooperation, social skills, and emotional intelligence (Goleman, 1997). She mentioned that one explanation of her success was social skills. "I had a really good research group and team. I also put a lot of effort into it. I tried to create a good spirit by arranging all kind of happenings to connect the group members." She wanted to help her students. "I had thought about what I can do. I can be a role model for becoming scientists. My aunt who was a dentist was a role model for me."

Endless hours of work.

When "Professional leader's" children were young, she came home from work around five to spend some time with her children. While other family members watched television at night, she sat on the sofa reading. She was physically present with her children, but concentrated on her own work. Work was almost an obsession for her, as she explained, "I expected too much from myself. It was stupid that once I had time for half an hour I should have been reading something. Was that necessary?"

Social values directing life choices.

In addition to having strong values of work and family, Leena wanted to help others. "I had strong social values. If I would have retired or quit my job, I would have worked as a volunteer." As a young student she worked in many volunteer organizations and gave donations to the charity. She also connected the values of humanism to her work: "I think that science in general brings the whole society and the world a step forward and will eventually lead to something new."

6.4.3 Reflective accounts of transformative themes

Brickhouse, Lowery, and Schultz (2000) emphasized the need to understand how students are constructed or construct themselves in order to find out how those identities overlap with their views of scientific identities. Similarly, in this reflective story, which illustrated the findings of secondary analysis, I aimed to investigate how differently professors' critical events were constructed as they reflected back on their scientific achievements. What was behind their critical events? Why did those critical events made them successful? Next, I will continue using the examples of "Gatekeeper" and "Professional leader" to demonstrate two different ways to construct one's life story and experiences.

"Gatekeeper" based his story of critical events on academic achievements related to the domain. He had a strong, long-term goal orientation and early interest in and focus on his topic of study. His life goal was to learn from and to further the domain knowledge, and eventually, to create a new domain. He followed the examples of previous gatekeepers of the field and then became a powerful keeper himself by taking advantage of various situations and critical events. "Gatekeeper" was a classical example of a committed, achievement-oriented, and hard-working researcher (cf. Bloom, 1985; Leroux, 1998; Noble, Subotnik & Arnold, 1999; Van Tassel-Baska, 1989).

"Professional leader" followed a different path to professionalism. She exercised her "humane creativity" (Gardner, 1997) and acted upon her beliefs in social values, her sense of ethical judgment, and her perceptions of other people. As she explained, she "had gotten more than she had deserved" but everything did not come easily. At various times she had to work hard and sometimes to fight for her rights because, in both her personal and professional lives, she valued a fair game. Therefore, she found decision making, logical decisions, and non-shifting opinions uncomplicated for her, making her a respected and successful leader.

Even though all of the scientists were reflective about their lives, which illustrated the similarities among professors, the effects of reflection on their career choices were different as were the strategies used to evoke reflection. The skill of reflection (see also Gardner, 1997; Hébert, 1998) refers to the decision-making process or afterthoughts where professors evaluate different possibilities and the effects of various choices on their talent and career development. Partly due to the skill of reflection, these professors were able to analyze their critical events and to

learn from their experiences in order to become better professionals. For instance, "Gatekeeper" described the reflective process as follows: "Life is full of cross sections. Everything is based on luck, and it is important to have a nose, which points in the right direction. You have to make good notions (about the environment) and sell yourself." "Professional leader" described her reflectivity by noting: "How to plan our lives and what do we want from it is unconscious. I could have gone to medical school, but one year before I worked in the hospital and saw people die. It was hard, and I knew that I could not handle it."

Self-knowledge or sensitivity to inner feelings (Hébert, 2000) assisted most scientists in reflection and career planning processes. When these Finnish scientists searched for causes and deeper meanings in their academic work they created mental maps (see Patrick, 1988); they also used those maps to make meaning of their personal lives. They wanted to learn from their successes and failures (e.g., Gardner, 1997; Sternberg, 1996), which helped them to control their lives and promoted personal growth. As part of reflectivity, Finnish professors analyzed their obstacles well, which seemed to be one grounding force for scientific success (Bizarri, 1998; Csikszentmihalyi et al., 1993; Harrington et.al., 1997; Sternberg, 1996; Whatley, 1998).

6.5 Concluding second research segment: Differences with/in sameness

In the following section I exemplify how differences are present with/in thematic similarities. I continue to use examples of "Gatekeeper" and "Professional leader" but also incorporate the life stories of other participants. Assuming that high achievements in science are usually advances in the domain, that have been valued by the field (Csikszentmihalyi et al., 1993) the various effects of the domain and of the field to one's academic career cannot be underestimated. Without learning the rules of the domain or being evaluated by the field, the professors would not have had their individual giftedness noticed. The field also provided professors with mentors, tenure, grant money, laboratory equipment, and research positions (as in the stories of "Gatekeeper" and "Professional leader"), or occasionally it did not support the researcher's interests as was shown in for example in Kalle's, Veini's or Arto's life story. Kalle had difficulties in

receiving grant money because various research organizations were not willing to support his unusual combination of research interests. Also Veini and Arto's uncommon research lines delayed their career plans due to the obstacles they faced when applying for academic positions.

All Academy professors mentioned mentors (cf. Ambrose et.al., 1994; Benbow et.al., 1999; Noble et.al., 1999; Ochse, 1990; Walberg & Stariha, 1992) and had some experiences of mentorship, but not every one valued the relationship similarly. Mentors served as role models for many (i.e., "Gatekeeper"), but others (i.e., Kalle, Suvi, and Kaarina) stated how they set their own personal short-term goals, such as finishing a degree or completing a certain project, while their career development or accomplishments with mentors were secondary goals. Self-direction, initiative actions, the creative process, and international experience during the scientific career promoted success and maintained these scientists' interest. For example "Gatekeeper" developed his interest in the domain early whereas "Professional leader's" career choice came later. Both "Gatekeeper" and "Professional leader" spent years in foreign universities during their postdoctoral training, but for example professors Kalle and Eija gained their international experiences later in their career. Years spent in foreign universities and in laboratories were starting points for networking among colleagues, and most importantly, life long connections were established from these experiences. Most of the professors created their own domains, departments, and original lines of research.

Professors were lucky to be in the right place at the right time, to have access to resources, to be selected for eminent positions, and to find supportive mentors. But luck changed throughout the life-span and reasons why they were lucky varied. "Gatekeeper" was lucky after receiving his Ph.D. when he was able to cooperate with a world-famous mentor, who influenced his career development. "Professional leader" was lucky during the school years to be able to have access to educational and financial resources. Maybe all professors were lucky because they had learned their lessons, searched for possibilities, were more active, and took more initiative than their peers. Maybe luck was connected to problem solving skills, creativity, or intuition.

Overall, these professors had similar critical events, but also a variety of different professional and personal experiences that helped them to gain academic achievements. Lohman (1999) defined factors relating to the academic talent such as experience, mentoring, motivation, and volition, but the findings of this study do not promote the generalization of

his factors without doubts. In fact, Lohman's findings reflect the themes of sameness found also in this study but those factors or elements are situated and culturally bounded. Professors of the Academy of Finland developed their individual strategies to adapt to the environment (in this paper mostly referring to the domain and to the field) and to find ways to make their environments fit their professional and personal needs and personalities. Similar to Olympians in Tirri's (2000b) study, Academy professors were self-directed and internally motivated. With much persistence, they learned how to take advantage of opportunities and to shape the critical events to suit their goals and purposes instead of letting the environment control them. However, I suggest that scientific high achievement and giftedness differs depending on individual, culture, domain, and field. Success in science is a life-long process, which is most likely difficult to predict. But every new study adds an important perspective into domain knowledge of scientific giftedness.

7 Research Segment of Women Scientists' Critical Events

7.1 The purpose of third segment: Sameness and differences within multiple subjectivities

The purpose of the third research segment was to study gifted Finnish female scientists and their similarities and differences related to academic success. The female perspective of scientific giftedness was not emphasized in the research questions but this segment added additional perspective to the elements that contributed to the scientists' academic success throughout their life span. Women's life stories had particular characteristics, which would have stayed unknown without exploring this type of analysis. In poststructural spirit I also desired to know what kind of different knowledge the use of critical incident method could produce compared to the analysis of critical events that was conducted in the second research segment.

In this segment of women scientists, two different studies (the study of mathematical Olympians by the first author and study of Academy professors by the second author) were combined, which made possible the study of scientists in various stages of their careers. Critical events were divided in two sections: important choices (e.g., decisions concerning work, family, beliefs, and values) and compromises (scientific and personal), both of which were affected and contextualized by culture. The results of this analysis demonstrate similarities in the themes of critical events that contributed to success. However, no picture of a uniform academic woman is found. All gifted female scientists have actualized their talents by having different, multiple roles and subjectivities.

7.2 Status of female scientists in Finland

Finnish women have a long history of independence and women's rights, which contributes to the academic tradition of women. For example, based on the OECD (Organization for Economic Co-operation and Development) statistics, the numbers of Finnish women earning academic

degrees is among the highest on an international level. In 1901, Finnish women were granted admittance into universities, and today approximately 80% of Finnish women work. According to Wager (1994), it is becoming more common for fathers to take paternity leave while mothers resumes their academic careers. The change in societal attitudes and benefits provided by society (e.g., nine-month paid maternity leave) promoted women's control of their lives and contributed greatly to their talent and career development (Reis, 1998).

Still, differences among academic males and females are apparent. For example, faculty in Finnish universities remain male dominated, and the percentage of women professors is still very low (17%). Concomitantly, women tend to have fewer publications than their male colleagues (Ajzenberg-Selove, 1994; Piirto, 1991). Within equities such as these still prevalent, researchers have studied the obstacles (e.g., Bizarri, 1998; Leroux, 1998; Kerr, 1994; Reis, 1998), psychological characteristics (e.g., Holahan, 1984; Noble, Subotnik, & Arnold, 1999; Rogers, 1991), and environmental effects (e.g., Kitano, 1997; Tirri, 2000a), comparing women to each other and to men. Conflicting demands (Acker, 1984), lack of female role models (Fox, Benbow & Perkins, 1983), and other obstacles such as cultural, parental attitudes, possible discrimination, self-criticism, and low expectations still hinder females' academic success. Also, the complex decisions related to emotional intimacy and professional achievement make the act of balancing one's life more perplexing, but successful women display contextual intelligence (Sternberg, 1986) and indicate polyvalence (Gagné, 1999), which help them to adapt to changes. Finding a balance (cf. Etzkowitz, Kemelgor, Neuschatz, Uzzi & Alonzo, 1994; Raehalme, 1996) instead of choosing either a personal or academic life contributes to the well-being of high achieving females (Hansen & Hall, 1997).

7.3 Description of the data

Apart from previous research segments, which used data drawn only from Academy professors' interviews, data in this segment came from two separate studies. One part of the data was collected through interviews with Academy professors, but only data from the women Academy professors are included in this segment. The other data analyzed for this segment were based on interviews with six Finnish female mathematical

Olympians who participated in the Olympiad competition in mathematical subjects during the years 1965–1997. These scientists represent an exceptional group of Finnish women who have succeeded in male-dominated academia and in the Olympiad competition where less than 10 % of the participants are women (Tirri, 2000a).

Table 4. Description of Olympians.

Name	Age	Marital status	Field	Highest degree	Current position	Publications (1998)	Patents
Sirpa	26	Single	Medicine	M.D.	Medical doctor	0	0
Vuokko	29	Single	Physics	M.S.	Research Engineer	0	0
Riitta	53	Married, 4 children	Mathematics	M.S.	Secondary School Teacher	5	0
Hanna	36	Married, 2 children	Physics	Ph.D.	Researcher	28	0
Elina	32	Single	Physics	M.S.	Researcher	22	0
Kaisa	52	Married, 3 children	Mathematics	Ph.D.	Researcher	33	2

7.4 Data analysis of female segment

Both authors contributed to this analysis making it more complex and valid in several ways (see section of validity, p.23). First, the second author conducted the critical incident analysis (see section of critical incident method, p.41), which was followed by the thematic content analysis of founded events related to the choices and compromises of the Academy Professors. Choices and compromises formed the subcategories for themes. This analysis aimed to address similarities in the data. In each interview, all the choices and compromises were counted and labeled (see Table 5). Second, the first author of the paper analyzed the data set of female Olympians using the coding categories developed by the second author or redefining some categories to better suit her data set. After establishing the final coding categories, the authors exchanged the data sets to test the reliability of coding categories. The interrater reliability was .90 based on the independent scoring of 11 interviews by two raters and

an index calculated by the formula (number of rater agreement/number of life stories).

7.5 Data example: Important choices and compromises of gifted women scientists

7.5.1 Choices of gifted women scientists

Both Academy professors and Olympians of this study made important choices related to their work in choosing the right domain of science. These women had the personal talent (Moon, 2000) or intra personal intelligence (Gardner, 1993) to understand their own motives, inner drives, societal demands, and personal interests when making personal and academic choices. Many women chose to gain a variety of working experiences in hospitals, laboratories, clinics, and factories as well as to study abroad at foreign universities to promote their career (see table 5). However, more Academy professors than Olympians utilized work and study experiences as means to provide insights into the challenges of scientific work. Suvi, for example, described how summer work at a factory became a major promoter and a point of interest for her scientific career. She was fascinated by the role of workers and wanted to understand better the lives and struggles of the underrepresented work force. That work in the factory provided her with wider perspective and increased her motivation to conduct research on humanistic topics. Another Academy professors, Kaarina, stated the importance of foreign research experience saying: "I made a choice to spend a year in the U.S. as a visiting scholar. That year brought me connections, and I saw how work is done abroad. I was able to use that knowledge later in Finland in my research."

Academy professors highlighted the choice of gaining international experience whereas Olympians in their interviews emphasized more the choice of selecting the right domain and building their interests inside domain. It was important for both groups of women to find an appropriate fit between their personal interests and academic field. Olympian Sirpa stated: "I have enjoyed my domain because it involves studies in mathematics and science. It has been easy for me to advance in my work because I chose a domain that allows me to enjoy the beauty and logic of math and science." Academy professor Eija, in her turn, mentioned how

she changed her job description and moved from laboratory work into administrative tasks. That enabled her to shorten her working days and to manage her time better.

Marrying a supportive husband who allowed women to follow their interests was identified as the most important choice in the lives of both married Academy professors and Olympians. Family and an encouraging spouse have also been reported as influential factors for female Nobel Prize winners' successes (McGrayne, 1993). Academy professor Helena described that her most influential choice related to family: "I have told my daughters and my son, too, that the choice of a spouse is the most important choice in your life. It makes a difference in everything; the choice of a spouse is more important than choosing the right career. It even determines what kind of children you are going to have and how easy it is to raise and educate them." The married women in this study took time to establish their families; for example, they stayed home during the maternity leave. In many cases in order to balance their various tasks of family and professional lives, women mentioned the importance of hiring outside help for childcare and for cleaning. Olympian Kaisa used her sister as a babysitter and hired outside help for household tasks. And, Helena stated: "Investing money in running the household smoothly has been worth every penny."

Most importantly, women had confidence in their capabilities (Callahan, Cunningham & Plucker, 1994) to overcome obstacles, believing that females are allowed to successfully combine professional and personal lives. Olympian Hanna, among others, valued and searched for choices related to the challenge and the competitive mind. She was self-confident, curious and had a desire to challenge herself: "I need to know how things work and I want to be challenged in my life. All competitions have been very important for me. I want to test my knowledge and show to myself and to the others what I can master in my field. I simply want to be the best." In order to maintain a positive self-image, women had to speak for their rights in situations where they were treated unfairly. For instance, some scientists had been discouraged from continuing their graduate studies by their professors, or they confronted negative attitudes toward tenure due to the gender politics of Finnish society at the time. However, the cooperation with others and specifically with other female scientists helped women to overcome the discouragement, to organize, and to prioritize their lives. Terttu, for example, intentionally chose to establish and to nourish close relationship with foreign colleagues to foster

the worldwide progress of her domain and to build wide networks of reviewers and evaluators for her work. Collaboration also allowed more time for women to maintain their mental and physical health.

Table 5. Critical incidents in the lives of gifted female Finnish scientists.

Critical incidents	**Academy Professors (N=5)**	**Olympians (N=6)**
IMPORTANT CHOICES		
Choices related to work	**9**	**12**
Work experience	2	1
Studies abroad	4	2
Right domain	1	5
Building one's interest inside domain	2	4
Choices related to family	**7**	**6**
Supportive husband	3	2
Time to establish family	2	3
Hiring outside help for home	2	1
Choices related to beliefs and values	**13**	**19**
Searching for challenge	3	5
Competitive mind	1	5
Utilizing co-operation	2	4
Speaking for one's rights	3	0
Maintaining one's health	1	1
Prioritizing one's life	3	4
COMPROMISES		
Scientific identity compromises	**7**	**3**
Career choice	2	2
Completing unmotivated task	1	1
Focusing inside one's field	2	0
Job placement choice	2	0
Personal compromises	**9**	**4**
Traveling abroad with husband	2	1
Gaining financial independence	1	0
Creating time for family	4	3
Sacrificing one's health	2	0

Note: Numbers in bold indicate the total number of responses in subcategories

7.5.2 Compromises of gifted women scientists

In addition to the choices women made that mostly positively affected their careers, researchers identified compromises that highlight difficulties, and are divided into two categories: scientific identity and personal compromises. Compromises were defined as life situations where two competitive events occurred simultaneously and women had to make a forced or voluntarily decision between two equal demands. In both groups, women made scientific identity compromises when choosing their career or completing a work-related but unmotivating task. For example, instead of specializing in an area of her major interest, which required working night shifts, Helena decided to focus on another area of specialization, which allowed her to spend more time at home. Olympian Elina completed tasks in her previous and current positions, which were not of special interest to her, but were requirements of the job. Similarly, Terttu compromised in order to complete her degree despite her lack of motivation and her desire to work in a different position. Unlike the Olympians, the Academy professors compromised when making decisions about the focus of their field or time devoted to research. Women tended to focus on tasks that were most useful for their career development or that promoted their students' careers. Academy professors overall faced more societal expectations, "pressure" from their scientific communities, and less freedom to direct their personal and professional lives than did Olympians.

The female scientists' personal compromises related to their husband's career interests and position locations. Cole (1987) viewed the women's position of following their husbands as a possible deficit that limited a female's bargaining situation in the search for better job opportunities. Olympian Kaisa and Academy professor Helena, however, took advantage of their husband's international relocation by seeking out educational opportunities for themselves. Unexpectedly, only one scientist, Kaarina, mentioned working between degrees instead of directly continuing her graduate studies as a compromise in that it delayed her career plans.

Both Academy professors and older Olympians referred to compromise related to creating time for family, which was seen as both a burden and a blessing. The balance between personal and academic life was sometimes difficult to maintain due to the conflicts created by multiple roles and conflicting societal demands. Riitta explained how the societal

demands and the role of mother, spouse, and woman prohibited her from continuing her studies. When older participants began their careers, women were expected to be passive and dependent whereas gifted individuals in general were considered to be active explorers (Rodenstein, Pfleger, & Colangelo, 1977). Those conflicting role expectations created a dilemma, which many women successfully solved. Sometimes, however, those conflicts turned into health problems, and women felt as if their mental and physical health suffered as a consequence of the conflict. Kaarina mentioned how she stayed awake all night for many years to be able to care for her sick child (in the role of the mother, nurse, and wife), but at the same time she had to continue working. Despite previous encounters and a variety of conflicting subjectivities, Helena and Terttu emphasized the balancing act of personal life, where family and children were an important source of joy, pleasure, and fulfillment.

The younger Olympians without their own families had not experienced any compromises or conflicts between "dual drives" (Whatley, 1998) [family and work]. They stated the importance of their work and the luck associated with being able to follow their career plans. Also, Finnish society allowed more freedom for younger women to follow their professional plans without "pressure" to establish families or to fulfill their task as mothers or spouses of professional men. The present social climate in Finland is more accepting of women to speak for their rights and to compete with men.

7.6 Concluding third segment: Women's multiple subjectivities

The society and culture played a key role in the general attitudes toward gifted women. The Finnish society enabled female scientists to combine the ethics of caring (Gilligan, 1982) with their needs to excel in science. Additionally, positive attitudes and encouraging feedback from spouses, families, and from other academics kept women focused and interested even when obstacles arose (see e.g., Zeldin & Pajares, 2000). Possible compromises that women made to overcome the obstacles did not prevent women from actualizing their talents. Rather than allowing the attitudes of others to affect their lives, these women chose to influence others with their beliefs and values. They had both academic and social resiliency

(Zeldin & Pajares, 2000) towards obstacles and towards negative attitudes of their personal or academic environments. The quality of life for these women was not the result of a satisfactory personal life only (cf. Bizarri, 1998), but a successful combination of personal and professional needs. Women learned to utilize the skill of "self-actualization" (Dai & Renzulli, 2000) and to promote their careers in positive and socially acceptable ways.

Even though female scientists had their special characteristics, conflicts, and struggles as a minority group in the male-oriented academia, there was no singular path to academic success. These gifted women and their personal and academic choices and compromises could be categorized in various ways, which all would lead to the different conclusions supporting scientific success. Women's subjectivities in science and in their personal lives, which were formed by choices and compromises, were culturally dependent and cannot be categorized in single terms of fixed labels such as "feminist," "antifeminist," "traditional," or "modern" (Wager, 1994). But women's various subjectivities revealed the situatedness and complexity of their life situations as well as highlighted the instability of single path to success. As in Talburt's (1999) definition of nonunitary subjectivity where individuals are always in production and the human is always in a state of transformation, age and academic positions affected these women's subjectivities and formed a variety of realities. Being a woman and wife had different meanings for an unmarried Olympian than to an older, married Academy professor. Furthermore, the subjectivity of researcher, colleague, or teacher was dissimilar depending on academic position, goals, research interest, research institution, and research experience. For example, Suvi's experiences and subjectivity as a factory worker transformed her subjectivity as a researcher whereby affecting her knowledge, experiences, values, and worldviews. Kaarina's subjectivity as a researcher working in the male-dominated field differed from Helena's perception of herself as a researcher in the field where more women hold academic positions. Additionally, Kaisa and Helena's subjectivities as wives, who traveled with their husbands abroad, were redefined when those women decided to take an advantage of opportunity to study abroad and to educate themselves.

Haraway (1988) suggested that

> subjectivity is multidimensional; so therefore, is vision. The knowing self is partial in all its guises, never finished, whole, simply there and original; it is

> always constructed and stitched together imperfectly, and therefore able to join with another, to see together without claiming to be another (p. 586).

Similarly, the scientists constructed their subjectivities as those subjectivities were simultaneously constructed by the environment, domain, and field. For instance, Kaarina's multiple subjectivities were affected by conflicting and simultaneous demands from her husband, colleagues, and children whereas Helena balanced her subjectivities and formed her environment by hiring outside help, cutting down working hours, and sharing the rest of the household work in a democratic fashion with her husband. Partly due to the Finnish society's support systems and accepting attitudes, women were able to redefine their subjectivities according to their own needs, values, abilities, choices and compromises, which made them successful.

8 Conclusion

In this work, I reconsidered the clarity of the term giftedness, dismissed unified meanings of creativity, celebrated differences among successful scientists, and questioned the existence of the "universal gifted man." By doing so, I did not exclude the category and discourse of sameness from the analysis, underestimate the functionality of themes, or desert the hermeneutic phenomenological origins of this study. But the answer to the domain related question of my research, "how do professors describe their scientific giftedness and creative processes?" produced epistemological and methodological questions during the research process. From an epistemological standpoint, I refused to write up the mastery project explaining the grounding reasons for scientific giftedness or creativity for I had come to believe, like St. Pierre (2000a) postulated that "reason is always situated, local, and specific, formed by values and passions and desires" (p. 487). Therefore, I argue that temporal contextualization creates the phenomenon of creativity and scientific giftedness, which cannot be categorized or completely captured.

Instead of writing or saying everything at once and to everyone (Richardson, 2000) I selectively chose data examples and exercised my curiosity and allowed space for unknowing. I chose not present hundreds of pages of interview data or document my whole dissertation journey in detail because my intent was neither to cover all possible and different explanations of how scientific giftedness and creativity could look nor to prioritize any single description of creativity. In the poststructural paradigm all definitions and stories are considered true, that is, true for someone at a certain time and place. In fact, I postulate that scientific giftedness and creativity receive significant meanings through differences and the analysis of deviations.

The purpose of this concluding theoretical and methodological section is to continue paradigmatic negotiation, to bring together the themes of sameness and difference found in data but to end this representation by connecting the themes to the philosophical assumptions of poststructuralism. First, I illustrate how themes across the segments produced shared knowledge of scientific giftedness, which was common for many scientists. Second, I move beyond the assumption of shared experiences and question if "shared" knowledge was common after all, because the

themes of sameness appeared differently for every individual scientist. In the second section I also illustrate how same critical incident method produced different kind of knowledge about scientific giftedness.

8.1 Utilizing thematic sameness

In this study, creativity promoted Academy professors' careers and constructed an important part of scientific giftedness (see e.g, Renzulli's, (1978), theory of giftedness). Various creativity metaphors created by professors described thematic similarities found in all data of creativity: uncertainty of productiveness, analytic steps of problem solving, intuition, vision, experiences of flow, utilization of cooperation, luck and external stimulation such as ideas from literature, conferences, and collaborative meetings. Additionally, professors' experiences with creative problem solving contained similar elements across data. Sakari's "growing plant" metaphor illustrated the holistic process of creativity, which began with collecting the ideas from various sources and then continued with analytic planting and growing process. The phase of idea development, which Wallas (1988) called incubation, was as difficult to control as an "ameba" because, as Gruber (1986) explained, the creator both "surrendered himself or herself to the requirements of the task and mobilized every personal resource to surmount its difficulties" (p. 259). Nevertheless, scientists were not successful in all problem-solving attempts. As illustrated through the "puzzle" metaphor, professors studied the current discourses, prevailing theories of the field, and previously unfinished works, which enhanced their capabilities to synthesize and to relate their new visions to the existing concepts (see Hargreaves, 1990). In similar ways, researchers Sternberg and Davidson (1999) emphasized the importance of preparatory work and the combination of new and old information in the process of gaining insights. Collaboration and the cumulative nature of knowledge promoted the progress in the professional lives of these scientists.

In addition to the shared experiences of creativity, critical events produced common themes and similarities among professors such as international experience, luck, significance of a mentor, and strong interest and focus on the domain. Despite all previous events and forms of support both Academy professors and Olympians faced various obstacles, which were most often related to academic encounters. Obstacles such as

lost job competitions, unsuccessful grant applications, or lack of time enhanced their careers by making scientists activate agency, take initiative, and analyze their mistakes. Skills of reflection during problem solving activities or sensitivity for inner feelings assisted both holistic and analytic approaches to creativity and scientific success.

Roe's (1953) report of successful scientists indicated a need for and desire of independence among scientists. Dacey and Lennon's (1998) more recent study showed similar findings and highlighted the functional freedom of creators that contributed to their successes, supporting the desire for personal and academic independence. Academy professors were in control of their lives and maintained functional freedom by being capable of restructuring situations and by making intuitive leaps between possible and less possible solutions to their personal and academic problems. When independence was threatened they spoke for their rights and prioritized their lives. Instead of letting critical events solely shape their lives scientist also shaped the events. In particular, the strong, dual role of female scientists combining personal and academic lives initiated effective co-operation and demanded supportive relationships. The dual roles, multiple situated selves (Goodson, 1998), and positive multilayered self-conceptions (Hébert, 2000) became possible in the Finnish society because of its emphasis on gender equity and supportive societal networks. Women scientists enacted agency that was not predetermined. Subjects (women scientists) were situated, constituted by power relations, societal attitudes, and self-determination. Constituted characteristics of subjects became preconditions of subject's agency (Butler, 1992). Choices and compromises that Finnish women scientists had to make did not paralyze them from actualizing their talents.

Without connections to the domain both female and male scientists would not have been able to actualize their talents. Academy professors and Olympians had to learn the rules of their domains and to establish relationships with gatekeepers in order to become recognized and accepted in their domain. Scientists' career expectations were realistic, and they invested time, financial resources, and effort to promote their careers. The most successful scientists learned how to combine two or more domains in order to promote their individual interests. Scientists and Olympians were able to define success in their own terms, to exercise agency, and to reformulate expectations of personal and academic life. However, the balance between personal and academic was not stable but rather was always in flux between various roles scientists had and their

"fragmented" (Lacanian term in Appel, 1998) subjectivities, which enhanced professors' scientific giftedness and academic success.

Difference also constituted and directed the interpretations of creativity and themes of critical events. For example, "Gatekeeper's" critical events related to the domain, and his explanations of those events were grounded in the academic discourse whereas "Professional leader" supported her critical events with ethical arguments. Moreover, interest, luck, international experiences, or the role of mentoring affected professors' lives differently. Labels and identifiers allowed participants to tell their stories but contexts and meanings within the stories differed.

8.2 Move towards difference: Facing ontology, epistemology, and methodology

Even though it was useful and pragmatic to utilize themes of sameness, I could not stop there. Metaphorical, multilayered, and diverse data as well as my philosophical readings required a methodological and representative move beyond the themes of sameness. That move changed the nature of entire research. Because I discovered that creativity, success, and scientific giftedness appeared differently, in different degrees, and for different reasons, the research goal of highlighting the essence of scientific giftedness turned into the desire to accentuate differences within data. In the following paragraphs I will illustrate how those differences came into the play. In order to justify my representative turn towards exploration of differences I had to ground my discourse deeper into ontology and epistemology. Additionally, in the poststructural spirit I wanted to illustrate how same analysis method produced different knowledge, which itself supports notions of multiplicity of reality and its connection to the chosen linguistic expression. Therefore, I conclude this section by theorizing the ontological and epistemological conditions, which made the methodological move within this work of double practices possible and/or necessary.

The first research segment of creativity metaphors illustrated how creativity can be seen as a crystal or a collage. For example, a crystal illustrates the multidimensionality of creativity where various characteristics or stages of creators such as collaboration skills, solidarity needs, sensitivity, persistence, and self-confidence, were present but appeared as

different sides of crystal; and, therefore were not necessarily visible at the same time. Professors described the steps of successful creative encounters not necessarily in a linear manner following one after another but as separate tasks, which also operated individually connecting to a certain time and place. In the collage metaphor of creativity, multiple interpretations and various layers of creators' characteristics, stages of creative process, and types of creative products tangled together and became impossible to separate. Often questions such as "Was it Sakari's collaborative effort, successful preparation stage, or nature of problem to be solved that made the plant grow and his creative efforts successful" became impossible to answer without relating these various aspect to each other.

The second and third research segment utilized the analysis of critical events but the methodological approach toward similarities and differences was to a certain extent different in each segment. Same data analysis method of critical incidents produced different knowledge and highlighted differing aspects of scientific giftedness. As Flanagan's (1953) work of critical events emphasized similarities of data and common meanings a somewhat similarly data were analyzed in the research segment of women (Tirri & Koro-Ljungberg, in press). Shared experiences and the stability of knowledge, labels, and categorized events were more evident in the analysis of women than in the second research segment with "Gatekeeper", and "Professional leader," which highlighted situated knowledge and differences created through critical events. However, both segments concluded that a united, universal gifted scientist or woman was not found. Professors and Olympians' critical events and their effects on scientists' lives were closely connected to time and place. Similarities of common themes were found but the closer analysis revealed differences in the interpretation of thematic words and categories. For instance, luck, international experience, multiple subjectivities did not affect Academy professor and Olympians in similar ways and the role of mentors had different impacts on scientists' careers, depending, for example, upon time and the quality of the mentorship. Female scientists' subjectivities of wife, single woman, scientist, teacher, colleague, nurse, factory worker, which were formed by choices and compromises contributed differently towards women's aims to actualize their scientific giftedness or to shape their personal and academic lives. Unstable and multiple combinations of subjectivities made women's career paths and professional experiences unique and individual. Even though participants had many things in common, women's stories were unlike men's, older participants had di-

vergent experiences than younger ones, and professors from humanities had dissimilar life events as gifted scientists than colleagues in the field of medicine.

Partly the tension among experiences of participants, domain knowledge, other theoretical assumptions, and pragmatism transformed into a collaborative dialogue between ideology and experiences of the field. The notion of not being capable of making sense of my data holistically produced different knowledge and produced knowledge differently (Lather, 2000a). My research turned into an arena of textual experimentation wherein the text was turned against itself, interpretations questioned other interpretations. Layers of subjects illuminated diverse standpoints, which were unequal and impossible to rank according to their "truth" value or to their connections to reality. People's meanings and understandings shift across time and across situations (Scheurich, 1997). This research topic and diverse, shifting data also requested more "reading for differences" as opposed to just "reading for similarities" (Lather, 2000b). Multilayered data enabled me to experiment outside of traditional borders of single paradigms and to complicate traditional ways of knowing. Like Denzin and Lincoln (2000), I agree that

> we can no longer separate ideology and politics from methodology. Methods always acquire their meaning within broader systems of meaning, from epistemology to ontology. These systems are themselves embedded in ethical and ideological frameworks as well as in particular interpretive communities (p. 1021).

In this work of double practices the line between methodology and ideological assumptions became blurred. Ideological assumptions of phenomenology and poststructuralism mingled with each other creating a methodology of double practices. Denzin and Lincoln (2000) also continued emphasizing that scientific practice does not stand outside ideology and good texts invoke commitments to ideology. In other words, methods [or double practices] acquire their purport from the network of meanings (Gergen & Gergen, 2000), which are interwoven in ideological traditions.

As explained in the previous section of poststructuralism I gave up the notion of foundationalism and replaced it with "positivities" (Lather 2001), accepting the world as it appears to be. In the ontological sense, realities appeared for me as reconstructed by de-centered subjects (Lather, 2001) instead of as created by one, single "universal gifted man." Characteristics that made scientists gifted were different and de-centered in

comparison to the general, fabricated characteristics of high achievers. In the methodological sense, metaphors and critical events emphasized specialties of actual practices instead of fixed categories. Moreover, events and the descriptions of creative process were positioned as historical moments in flux, which disrupted "empty sameness" (Foucault, 1980, p. 117) of constituent subjects.

I believe that in order to disrupt the concept of sameness, sameness with "true", single identifiers, we have to acknowledge the similarities, which enables us to refer to the interrelated differences and thereafter to situatedness and partiality. But I also agree with Berube (1993) who said: "Partiality needs to be interpreted in its turn" (p. 191-192). Multiple points of views, multiple criteria for judgment, and "multiple narratives" (Deleuze & Guattari, 1980/1987), which are not dichotomous but all true will promote the study of partiality, where, for example, life stories, critical events, and metaphors produce "truths which are socially, ideologically, and historically conditioned" (Hutcheon, 1987). The study of differences is a process, where ultimate solutions cannot be produced or they will bring difference to a closure, referring to the empty sameness, referring to the "true notions" of existence. Only processes where multiple solutions produce differences are possible. In fact, Crosby (1992) encouraged researchers to think differently about differences and view difference as a problem for theory not as a solution.

8.3 Ideological generalization of this study

As noted earlier, the major purpose of this study was not to generalize about populations but to generalize in terms of ideology and methodology. I believe that more research must be done in order to imagine alternative ways to succeed and to become scientifically gifted. VanTassel-Baska (1994) emphasized the importance of studying successful adults and factors that relate to their success and life satisfaction. In her opinion, future studies could focus on critical events in different stages of a life span. But, moreover, increasing numbers of alternative ways to construct research, to investigate research practices, and to conduct qualitative studies are needed. Research promoting the spirit of sameness and the search for similarities could help to provide better conditions and special support systems for the next generation of scientists, engaging teachers, educators, parents, other scientists, and society to act upon common expe-

riences, to provide advanced learning possibilities, and to remove the hindering obstacles. But, by noting the differences, we can promote the individual needs of gifted students, and the implementation a variety of learning tools such as enrichment, inquiry, discovery, problem solving (Gallagher, 2000), targeted career education, and alternative evaluation strategies.

Gifted education in the future should reevaluate current research and teaching practices and tease out pluralistic theories, which all are human constructions (LeCompte & Preissle, 1993), and which engage us to understand giftedness from the inside (Hunsaker & Callahan, 1995), outside, and from every side. Multiple definitions and theories of giftedness and creativity could make everyone gifted or creative in some areas; but, as Gagné (1993) pointed out, in any one ability or talent domain a 15-20% threshold of excellence would still apply. Additionally, I postulate that instead of searching for one, "true" theory of giftedness and creativity researchers should create rich configurations and "well-developed accounts of how gifted children think, feel, and experience" (Grant & Piechowski, 1999, p.11) that situate them at certain times, in certain contexts, and in particular places. The "true" definitions of creativity and scientific giftedness should be analyzed carefully if not troubled (see Uusikylä & Piirto, 1999). As there is no single theory to cover all gifted individuals' path to success or to explain the high achievement in science (see also Trost, 1993), neither is there a single life story to cover all that a life is for a person (Denzin, 1989) or to claim final standards for production of human knowledge (Berube, 1993). Thus, interpretations proliferate our understandings of the world whereby "no interpretation can claim to be the final one" (Sarup, 1993, p. 52). I believe that conceptions of creativity and scientific giftedness are contingent rather than grounded into a single reality.

Instead of building "grandnarratives" in gifted education (Piirto, 1999), I call to question how labels of gifted and creative are created, what kind of knowledge about giftedness should be produced, and how researchers should go about studying differences? Furthermore, questions such as "how is giftedness put into discourse?" and which institution is creating the language to speak about scientific giftedness or who distributes the things that are said about creativity should be answered. We should begin with the search for commonalties and to utilize those commonalties in order to continue the search for differences that embrace epistemic uncertainties of creativity, cultivate the spirit of enriching dis-

similarities, particularity, dissensus, and irregularities of giftedness and the plural conceptions of academic success.

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Appendices

APPENDIX A: Research process.

Time period	Stages of research process	Major decision or act
1996 March	Started reading, thinking about the topic.	Chose the major professor.
1996 May	Determined suitable research group in the process of investigating scientific giftedness.	Chose giftedness as an area of study and Academy professors as a group of study.
1996 August	Read Csikszentmihalyi, Bloom, Gardner, and Erikson, among others.	Chose social construct of talent as a major theoretical concept.
1997 June	Participated in creativity course with Dr. Piirto. Became interested in the relationship between giftedness and creativity.	Constructed creativity as a part of scientific giftedness in my model.
1997 August	Became interested in the role of personality in the lives of the gifted, more readings.	
1997 October	Formulated interview questions. During readings every time I came across interesting interview question I wrote it down and placed it in an envelope.	Decided to conduct open-ended interviews.
1997 November	Created the interview guide.	Finished the interview guide.
1997 December	Prepared for pilot interview.	
1998 January	Conducted pilot interviews at the University of Tampere.	Transcribed pilot interviews.
1998 February	Prepared for interviews of Academy professors.	Sent out the invitation letters.
1998 March-1998 June	Conducted interviews of Academy professors.	Conducted interviews and transcribed data.
1998 July	Constructed own definition of scientific giftedness.	Arrived at the University of Georgia.
1998 August	Read research of Renzulli.	Decided that the role of creativity in scientific giftedness is central.
1998 September	Reformulated research questions.	
1998 November	Gained deeper knowledge about research methods.	
1998 December	Decided to analyze data with various methods (e.g., analysis of critical event, metaphors).	Ended transcribing. Tried Nudist analysis program.

Appendix 1 continues

Appendix 1 continues

1999 February-April	Experimented more with Nudist. Conducted primary analysis	Decided to use Nudist as tool for data organization rather than for data analysis.
1999 May	Began writing and continued analysis.	Participated into the writing retreat.
1999 June	Read in poststructuralist theories.	Formed a writing group.
1999 July	Wrote preliminary article drafts.	
1999 October	Troubled with need to go beyond themes .	Decided to conduct secondary level of analysis.
1999 November	Read further in poststructuralism.	Gained deeper understanding of connections between qualitative methodologies and philosophy.
2000 January-May	Prepared drafts of articles related to the findings.	Decided to utilize poststructural framework and philosophical orientation in data analysis.
2000 June- 2000 December	Read more about other philosophical orientations. Wrote and reworked with drafts and revisions	Created alternative ways to represent data.
2001 January-2001 May	Worked with revisions, presentations, and preface.	

APPENDIX B: Structure of the interview.

Part 1: Interview questions, which were presented on paper

- How did you become a scientist?
  - development from childhood to present
  - assisting words: childhood, youth, adulthood, family, school, career, motivation, expectations, and feedback
- How would you define scientific giftedness?
- How would you describe the relationship between giftedness, creativity, and success in your own life?

Part 2: Interview themes

"How would you describe…", "What were your experiences of…", "What was your impression of…", "What did you think about…..?"

1. **Childhood**
   Family members
   Talent development (e.g. projects, early reading, relationships, rewards)
   Role of the family in promoting school success
   Hobbies and interests
2. **School years**
   Characteristics as a student
   Special education
   Mentors or influential teachers
   Career choice
   Significance of schooling
3. **Work life (domain)**
   Combining work and career
   Goals and motivation
   Necessary characteristics in the domain
4. **Field**
   Tutors and colleges
   Cooperation
   Obstacles in the scientific career
5. **Creative Process**
   Usual working day
   Stages of creative process
   Special problem solving strategies
   Development in the problem solving process

6. Success

Reasons to be proud
Feedback
Sacrifices
Role of financial wealth
Role of luck
Way to success

APPENDIX C: Experiences from the field.

During this study, positive and negative experiences made me a better interviewer and ethically sensitive qualitative researcher. At times I became a "vulnerable observer" (Behar, 1996) feeling miserable and questioning my role as a competent researcher. For example, during two telephone conversations with one of the scientists she judged my study and methodological choices and claimed me to be a very unskilled student who was not ready for a scientific career. "You do not know anything about methodology and surely have proved that during these two phone calls." I could not even defend my method choices without her to become more upset. "Do not dare to teach me". She explained in our first conversations that she thought that I did not approach her or talk to her properly according to her status. During the second conversation, she emphasized that she was not refusing to participate but wanted to receive and to read my research proposal in order to evaluate my competence as a graduate student and scholar. Many months after receiving my proposal she replied saying that she could participate in my study. I e-mailed her in response, telling her that it was too late because I had moved and the interview was impossible to arrange.

Another rather unpleasant incident occurred when I phoned another professor to inquiry about his participation to the study. I had not received a signed response from him. When asking for an explanation why he did not want to participate he replied: "I do not have to explain to anybody why I do not want to participate in your study". He continued, saying, "I do not make someone else do my study either" as if he was doing the entire research for me by participating. He did not participate.

A third professor decided not to participate because we could not coordinate our schedules. She was very busy and accused me of taking her valuable time. She cancelled our first scheduled meeting and during the second rescheduled appointment when I traveled to meet her and arrived at her office she could not give an interview. She just told me "today is not a good time. Just when I arrived to my office and thought I could work, you came." "If I would give a speech for companies I would charge 15000 marks for one and a-half hour presentation", she explained. She suggested: "Could we talk on the phone for few minutes and that would be it?" I chose, in the end, not to include her in the study because a brief phone interview did not meet my research purposes.

Beyond these three experiences many positive and encouraging incidents and things happened to me while conducting the interviews. For example, when I interviewed Simo in his home, the atmosphere was relaxed and informal. He had set up coffee and sandwiches on the kitchen table where we sat for almost four hours talking about his life and about my future in academia. He showed me his home and his family's art collections. Similarly, Reijo greeted me warmly. In his office, there was a cake waiting for me, and we toasted my dissertation. Reijo was well prepared, interested in my topic, and had thought about the possible questions forehand as he later explained. At the end of the interview Reijo wished me all the best, and he offered to assist me as I continued my studies and research.

Pleasant experiences continued even though on the way to meet "Gatekeeper" my train was late and I could not find his office because I did not have a detailed map. On the way I stopped two pedestrians to ask for directions who showed me the longer road, which made me even more late for our appointment. When I finally arrived "Gatekeeper" had a lunch for us "because I thought that you might be hungry" he said. After our successful and interesting interview I washed our lunch dishes and "Gatekeeper" escorted me back to the train station.