

Reports from the project

Individual Development and Adaptation

ABILITY AND SATISFACTION WITH SCHOOL AND JOB

A longitudinal study

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- No. 79 Wångby, M., Magnusson, D., & Stattin, H. Self-perceived psychological health among Swedish teenage girls: 2. Time trends in frequencies of adjustment problems between 1970 and 1996. (*March 2002*)
- Nr. 80 Näswall, K., Sverke, M., Isaksson, K., Johansson, G., & Lindroth, S. Arbete, utbildning, familj: Beskrivande statistik från den personliga intervjun i IDA-II. Teknisk rapport. (*Augusti 2002*)
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- No. 84 Wångby, M. Questions about life-style in 2002. Follow-up survey on the 1998 data collection among females in the IDA-project. Technical report. (*March 2004*)
- No. 85 Trost, K., & Bergman, E. Men's work and well-being in a lifespan perspective. Technical report from the 2002-2003 data collection. (*September 2004*)
- No. 86 Lindfors, P. Questions on women's situation, life satisfaction and health. The 2004 IDA follow-up survey on women. Technical report. (*October 2004*)

- No. 87 Lindfors, P. Stress, health and well-being in midlife. The 2004 stress study on men. Technical report. (*December 2005*)
- No. 88 Selén, A. Sambandet mellan generellt och områdesspecifikt välbefinnande: En jämförelse mellan män och kvinnor. (*Oktober 2006*)
- No. 89 Daukantaite, D. Women's health, work, and education in a life-span perspective. Technical report 3: Overview and detailed descriptions of the questionnaires. (*January 2007*)
- No. 90 Wulff, C. Ability and satisfaction with school and job. A longitudinal study. (*Licentiate thesis, May 2007*)



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Foreword

In this licentiate thesis by Cornelia Wulff, the relationship between ability and satisfaction with school and work is studied. The data for the project come from the main group in the IDA program.

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Stockholm, April 27, 2007

Lars R. Bergman
Professor
Head of the IDA program

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In memory of my Grandfather and Grandmother

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Abstract

This licentiate thesis concerns ability and job satisfaction from a longitudinal perspective, and across occupational areas. The study is based on data from the Individual Development and Adaptation (IDA) research program. The sample consists of 1392 women and men followed from age 10 to midlife. Ability is weakly related to school and job satisfaction, and the relationship is mediated by school and work achievement. Early school factors have impact on midlife occupational level (work achievement) and job satisfaction for both sexes. Ability and job satisfaction vary between occupational areas, and when occupational level is taken into account. However, high work achievement/ occupational level seems to often be related to high job satisfaction. Finally, overachievers seem to be more satisfied than other groups. The results might be important for school policies, vocational guidance, and selection in the educational system and labour market.

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This licentiate thesis contains the following studies

Study 1

Wulff, C., Bergman, L. R., & Sverke, M., (submitted for publication). Intellectual ability and satisfaction with school and work: A longitudinal study from age 13 to 48.

Study 2

Wulff, C., (manuscript). Ability and job satisfaction across occupational area and occupational Level

Preface

Introduction

This licentiate thesis concerns the relationship between ability and satisfaction with school or work from a longitudinal perspective, studied in a large, representative Swedish sample and with the aim of contributing to our understanding of the importance of ability for job satisfaction. Broadly speaking, it is reasonable to expect that a person's ability will influence how well he or she can manage a job and have consequences for the person's job satisfaction. The involved mechanisms are, however, complex, as will become apparent in this thesis.

As a starting point for the reasoning, the following argument for the relationship between ability and job satisfaction is given. If a pupil performs well at school, he will have a better chance of obtaining a desirable education or vocational training than if he does not perform well at school. The chances that he will get a job that he wants and that satisfies him will therefore be improved. An important aspect, if this is going to happen, is that the pupil needs the capacity to perform well in school and at work. This capacity depends on different psychological, social and economical factors, as well as on what kind of opportunities the pupil is given with regards to getting a decent education and a proper job. As such, one important factor is the pupil's intelligence. In this licentiate thesis, it is argued that intelligence may indeed be important as a factor that promotes success and increases the chances of satisfaction at school and at work.

It is obvious that the process towards the vocational choice/choices starts in childhood and that a variety of major developmental stages are of importance at different periods in an individual's life history. Nurmi (1992) examined life goals at different ages; during adolescence and early adulthood, education and finding a partner were central, but later, in middle adulthood, concerns about doing reasonably well at work and about one's children were paramount. Older people were more concerned about leisure activities and health. Women were more interested in self-development and education than men were, and men were more interested in leisure activities than women were (Nurmi, 1992). This may be reflected in the studies in the present licentiate thesis, since when one reaches one's goals it probably produces feelings of well-being. This might be a kind of life satisfaction; a general satisfaction that, for example, makes it easier to handle hassles at work and thus influences job satisfaction positively during different periods of one's life.

Personality and its implications for performance is an important issue for organisational psychology and it has a long history. Kanfer, Ackerman, Murtha and Goff (1995) presented an overview of the history connecting organisational psychology, intelligence and personality. Since the beginning of 20th century, there have been attempts to predict performance, and during the two world wars there was an urgent need to recruit people in a way that matched their ability to the job demands. Some of this knowledge was later used in the industry organisations. It has been showed that ability indeed predicts job performance and occupational level (combined with social skills and in terms of salary; for example, see Ferris, Witt & Hochwarter, 2001). Research shows that ability is important for job performance, so if ability predicts job performance, what about job satisfaction?

Is there a relationship between job satisfaction and an individual's mood and personality at work and at home? If so, does this reflect that life satisfaction in general influences job satisfaction? Judge and Illies (2004) concluded that a positive personality

type and mood did contribute to job satisfaction. They also found that mood at work contributed to mood at home. Reciprocity was also discussed. Different personality types were also found in different work settings, especially when the person-environment fit was important to perceiving job satisfaction (Holland, 1959, 1966). This is an argument for the importance of personality for job satisfaction. In this licentiate thesis, it is argued that there is a relationship between personality in terms of ability and job satisfaction.

Expectancy theory seeks to explain job behaviour and job attitudes. Expectancy of certain outcomes (such as salary) promotes the effort put on performance and the standard of job performance (Hackman & Porter, 1968; Lawler & Suttle, 1973). Therefore, if a person is satisfied in his job he may be more likely to perform well. This is an argument for a relationship between performance and job satisfaction, as is elaborated in the present studies.

Lawler (1966) examined job performance as a product of ability and motivation. It was argued that job attitudes were related to the belief that job performance was related to salary. Job contingency attitudes were "...the degree to which pay is perceived to be contingent upon performance" (Lawler, 1966, p 159). Lawler concluded that for those with high scores on the job attitudes measure, the relationship between ability and job performance was higher than in the group with low scores. For managers in the high-ability group, there were greater differences in job attitudes, measured as job performance, than among those with low ability. Furthermore, he suggested "The results of the present study clearly support the point that an ability measure can serve as an effective moderator of the relationship between contingency attitudes and job performance" (Lawler, 1966, p 161). Motivation was an important matter in such cases, as was pay. In this licentiate thesis, inner motivation and pay are two of the items included in the job satisfaction scale. Furthermore, it is argued that ability positively influences the relationship between job performance and job satisfaction.

What influences job performance? Lawler and Porter (1967) elaborated on this question in relation to their model. In that model, effort, effort-reward probability, role perception and ability contributed to job performance. They found that the expected rewards (that is, the importance of the expected rewards) influenced effort and self-rated job performance. An aspect was role perception – those who made a big effort and had high expectancies of rewards also performed well. Again, the expectance of desired outcomes was positive for job performance. This licentiate thesis has a theoretical reasoning, a rationale, with some connection to expectancy theory.

Intelligence, its stability, and its relationship to personality.

In the present studies, ability will be estimated by IQ data on verbal, inductive and spatial intelligence. The concept of intelligence is commonly used in psychology to explain different outcomes with regard to adjustment, performance and well-being. For example, intelligence contributes to better coping and adjustment. It might be that highly intelligent people use more problem-solving strategies but less-intelligent people use more emotion-solving strategies. Anxiety may also influence performance, and anxiety was found to be related to intelligence, but the direction of this relationship may be discussed. Furthermore, people who are more intelligent may find it easier to handle anger-provoking frustrations (Zeidner, 1995).

Ability is sometimes included in – and sometimes separated from – the concept of personality in the literature. In this licentiate thesis, ability and personality are seen as

related concepts. This licentiate thesis uses ability measures from ages 10 and 13 as predictors for school and later job satisfaction. Since ability and its stability are central here, I begin with a brief overview of ability, the stability of ability, its importance, and its connection to personality.

Intelligence. A foundation to understand the nature of intelligence was laid by Thurnstone (1938), who made a theoretical model of the IQ concept using factor analyses. He suggested IQ consisted of nine primary abilities (spatial, perceptual, numerical, verbal relations, verbal fluency, memory, inductive, arithmetical reasoning and deductive abilities). If a person had high values in some abilities, a certain ability profile, he might have vocational interests in line with those abilities. So, different abilities are important in different settings?

Another powerful attempt to explain intelligence and its implications was made by Horn and Cattell (1966), who elaborated on the theory about crystallized and fluid intelligence. They used 31 components (primary mental abilities and personality dimensions) in a factor analysis. They obtained nine factors, but suggested six of them were especially important: fluid intelligence, crystallized intelligence, general visualization, general speediness, facility – “Facility in the use of concept label, an ability to quickly bring words...” (Horn & Cattell, 1966, p 269), and carefulness –; “Carefulness, a factor indicating unwillingness to make a mistake...” (Horn & Cattell, 1966, p 269). Those variables were interrelated and connected to “an optimistic view of self, personality integration, independence and upward mobile social attitudes” (Horn & Cattell, 1966, p 269). The authors discussed that intelligence might be a reciprocal interaction between the person and the environment. If this is the case, how can this theory about interaction be implemented in the school environment?

The interaction of a person’s ability and achievement was to some extent studied by Gustafsson and Balke (1993), who combined ability with school achievement. They used a structural equation model with narrow factors to predict school performance. Their nested model had a general ability factor and some narrow factors. Three narrow factors emerged most prominently – one general visualization ability factor, one crystallized ability factor, and one numeric achievement factor. In total, these factors explained school achievement to a high degree. They also found a model with one general achievement factor and, below the general achievement factor (or “summarizing” it), one science factor, one language factor, one practical factor, one spatial-practical factor and one social-science factor. When the ability model was fitted to the school achievement model, the following relationship emerged. General ability was highly connected to general school achievement, science and language. Crystallized ability was important for general achievement, social science, and above all for the language factor. Visualized ability was very important for the spatial factor. Numerical achievement was also important for the practical and science factors. The authors concluded that it was useful to have a more-specific intelligence model, as used in the study, and that specific ability measures from grade six did predict specific school achievement in grade nine. Different abilities were important to gaining good results in different school subjects. Do different abilities have different strengths in relation to school satisfaction?

The above-mentioned theories have an impact on the theorizing in this licentiate thesis, in that the general ability measure used consisted of the sum of verbal, inductive and spatial ability. This “hierarchical model” has some similarities to both Cattell and

Horn's theories, and Gustafsson and Balke's theories. However, in this thesis a general ability factor was used in most of the studies since verbal, inductive and spatial ability had similar correlations as general ability with regards to school and job satisfaction.

Stability of intelligence. A high stability of intelligence has been shown in many studies. Different intelligence measures have been used. Bloom (1964) concluded in his review that intelligence is stable at about 11 years of age. In the same sample as in the prevailing licentiate thesis, a high stability in total intelligence scores, was found between the ages of 10 and 15 ($r=0.77$, Magnusson & Bakteman, 1978). Within the IDA (Individual Development and Adaptation) sample there is a sub sample where ability was tested both when the subjects were at the age of 10 and 13, as well as when they were young adults (by the age of 26). The mean of the ability scores from age 10 and 13 was correlated with the ability measure from the subject's score in young adulthood. The stability between the two periods was high for both genders, about .60. A similar result was reported in a Scottish longitudinal study, which found a stability coefficient for intelligence of .63 (unadjusted) between age 11 and age 77 (Deary, Whalley, Lemmon, Crawford and Starr, 2000). Consequently, research has shown that intelligence is rather stable in a lifespan perspective from about the age of 10.

Interpretation and impact of intelligence. Different definitions of intelligence exist. The interaction between person and environment has been discussed previously. Sternberg (1997) thought intelligence might be defined as "Intelligence comprises the mental abilities necessary for adaptation to, as well as shaping and selection of, any environmental context" (Sternberg, 1997, p 1030). Furthermore, "According to this definition, intelligence is not just reactive to the environment but also active in forming it" (Sternberg, 1997, p 1030). In his review, he concluded that there were differences in different cultures, what was significant for intelligence. Sternberg and Kaufman (1998) looked at different aspects of intelligence in their meta analysis of human ability. They concluded that different cultures hold different views as to what they regard as intelligence. They discussed different theories of intelligence and suggested that different approaches were possible. Similar ways to explain mechanisms behind intelligence across some cultures and theories may exist. A person has the capacity to select an environment he could adapt to and be seen as intelligent in. This may be seen in the study at hand, since it ought to be regarded as intelligent behaviour for an individual to select a proper work setting and a person-environment fit that contributes to job satisfaction.

Intelligence is, by tradition, connected to learning ability. In the US, the way to high-status education is heavily connected to IQ. A (high-) status education was often connected to good job opportunities and welfare – traditional measures of life success. If people were taught in ways that corresponded to their learning profile, they would perform better. However, the way IQ is measured today may be very narrow (Sternberg, 1997). In this licentiate thesis, an underlying argument is that a higher ability is probably needed for higher-education and school achievement.

The impact of ability on success for a youth embarking on working life is discussed briefly below. Brody (1997) showed in his meta analysis that IQ was related to school and job performance. IQ was also related to social class, educational level and occupational level. Wagner (1997) argued, in his meta analysis concerning the selection to different jobs and expected job performance, that it was difficult to make correct

decisions regarding this. Prior job performance and experiences were good estimates besides IQ, for predicting job performance. The author confirmed that by having a multi-factorial selection tool, one could avoid the risk of discriminating against minorities, and so on. Wagner (1997) also mentioned the importance of training. Cesi and Williams (1997) showed that schooling had an effect both on IQ and on income. IQ also influenced educational level, but varied across people with the same educational level. Thus, they suggested that something in schooling, aside from IQ level, was important to gaining a higher position and a higher income in work life. Among other factors, IQ scores seem important for upward mobility, in that IQ promotes life success (education, career and socio-economic factors). In this licentiate thesis, the rationale follows those lines.

Ability, personality and adjustment. There have been attempts to integrate ability and personality theories with work-related topics. Ackerman (1996, 1998) suggested in his PPIK theory (intelligence as process, personality, and interests; and intelligence as knowledge) that, with age, knowledge-based intelligence (similar to crystallized intelligence) has more and more impact on general intelligence. Hence, fluid intelligence was more important for general intelligence in younger people. Knowledge, vocational interest and intelligence are often related. Ackerman (1996, 1998) built the theory on Cattell's investment theory, Holland's theories, and the theory of the Big Five. Intelligence as process was similar to Cattell's fluid intelligence; moreover, it was in some respects a foundation to intelligence as knowledge. In Ackerman (1996, 1998) intelligence, both as process and as knowledge, was related to a Realistic interest and academic knowledge in physical science and mathematics. Intelligence as process was related to knowledge in mathematics, and intelligence as knowledge was related to Artistic and Investigative interests. Intelligence as knowledge was related to a TIE (a kind of intellectual personality/interests) personality, as was being a person with Investigative interest. A TIE personality was related to having a good knowledge of literature and social science, and a person with Investigative interest has knowledge in physical and social science Ackerman (1996, 1998). Furthermore, Rolfhus and Ackerman (see Ackerman, 1996) showed there was a high correspondence between interest (as described by Holland) and self-reported knowledge. According to them, there were clear correlations between verbal ability and knowledge in humanities, social science and art. There were also clear correlations between spatial ability and knowledge in mathematics, physical science and technology (Ackerman, 1996). There are connections between ability, personality and interests. If people with the same ability and personality have similar interests, they might prefer similar occupations.

In their meta analysis of adult intelligence, Ackerman and Heggested (1997) examined personality and interests. The aggregated literature on the topic suggested that ability and interests reinforced each other and were related. Furthermore, there was a connection to personality and different personality aspects – for example, the theory about Big Five and Eysenk's theory. Ackerman and Heggested (1997) made a review of literature concerning ability, interests, and personality, and the connections between them. In their review, they summarized Holland's theory. They found that the Investigative and Realistic interests types related to maths and spatial abilities; Literature interests correlated with verbal ability; but Social interest was negatively related to intelligence. Furthermore, mechanical ability was related to the Realistic type. Verbal ability was related to Investigative and Artistic interest types, but verbal ability

was not positively related to Enterprising and Conventional types (Ackerman & Heggested, 1997). Finally, they suggested a model with different trait domains in which: science/math interests were related to high ability in visual perception and the Realistic and Investigative personality types. Intellectual/cultural interests were related to crystallized ability, ideational fluency and personality traits such as absorption, TIE, openness, and Artistic, and Investigative and personality types. Social interests were related to personality traits such as extroversion, social potency and well-being, and to Enterprising and Social personality types (Ackerman & Heggested, 1997). Different interests, personalities and abilities were interrelated, and this aggregate has an impact on the person-environment fit.

There have been other attempts to examine the importance of person-environment fit for an individual's work-life adjustment. Tatsuoka and Cattell (1970) used the personality test 16 PF to predict and calculate an individual's adjustment in four specific jobs. They stated that "Given a sufficiently large (ideally exhaustive) set of occupational groups, we may predict that an individual will be best adjusted in the group for which his Y'_g score is largest, *subjective to the restriction* that it is not excessively greater than the mean Y'_g score of that group" (Tatsuoka & Cattell, 1970, p 333). Y'_g was a measure of the individual's belongingness to that group. That means the person will adjust better in a group with a personality type that is similar to his own. This may provide support for the need of a person-environment fit to perceive satisfaction.

A further attempt to explain the importance of person-environment fit was made by Matthews (1995), who described a model with cognitive (as process) factors in personality in a reciprocal relationship to environmental (content factors) to explain the relationship between personality and skill. Furthermore, he applied Eysenk's Extrovert Anxiety and Neurotism concepts in the model. Extrovert people searched for extrovert environments that reinforced their extrovert skills. For example, they were good at interacting with people at their workplace. Anxious people were far better in specific environments where caution was a good trait. Again, there seems to be a person-environment interaction.

Satisfaction with school and work.

It is suggested that school performance/achievement influences school satisfaction. It is argued that if pupils feel satisfied with their performance at school they gain self-confidence, feel motivated, proud and experience other positive school attitudes. Behind this reasoning are previous results based on the same sample that is used in the present licentiate thesis (for example, see Dunér, 1972; Magnusson, Dunér & Zetterblom, 1968). Since intelligence is seen to be related to school performance, there should be an analogous relationship between intelligence and school satisfaction. However, some studies have contradicted this (such as Diederich & Jackson, 1969; Ablard, 1997; Chapman & McAlpine, 1988). Diederich and Jackson (1969) confirmed that there were no differences in intelligence or school performance between satisfied and dissatisfied pupils. Teachers evaluated boys more negatively than they evaluated girls. Dissatisfied pupils felt they had no help; they felt ignored, dull and misunderstood. In addition, dissatisfied boys felt more restless and angry than satisfied boys did, while dissatisfied girls felt more bored and rejected in the classroom than satisfied girls. To conclude, school performance is not that important for school satisfaction according to some studies, but school performance is important in other studies. Is the level of performance important for the pupil's self-image?

There are pupils who do not want to do their very best in school. Nurmi, Onatsu and Haavisto (1995) concluded that underachievers in school had lower self-esteem than other groups. Furthermore, they had more task-irrelevant behaviour and expected to fail more than the normal group. They had more of self-handicapping behaviour than an attitude of learned helplessness in their reactions towards school. The authors wrote that their results highlighted the importance of teaching better coping strategies to underachievers. Thus, low school-performance might foster negative attitudes.

Pupils' perception of the job market, their interests and knowledge about it, are aspects in pupils' educational and vocational choices. Kvist and Söderlund (1979) examined pupils at the age of 15. They concluded that there were few differences between 1968 and 1978 in perceptions and preferences for different jobs. The gender differences were almost the same, but they were not as large as before. Girls preferred to work in the healthcare sector, in all status levels, and boys preferred high status levels in all occupational areas in the study (healthcare, business administration and technical). There were differences in work perceptions in the respective status level. The differences in occupational areas with respect to status level showed differences in work perceptions. It is reasonable to argue that pupils work perceptions guide their vocational choices and therefore will have an impact on whether they achieve the job they desire and experience job satisfaction.

Job complexity is important to perceiving job satisfaction. Ganzach (1998) examined the relationship between intelligence, education, job complexity, and job satisfaction. He found that job satisfaction and ability had a weak correlation but, mediated by job complexity, there was an indirect relationship. Education and job complexity were related, but education and job satisfaction were not. Ganzach (1998) also studied job satisfaction in different occupations, without respect to job complexity. Instead, he compared different occupations, noting a mean of intelligence for each occupation. He found that intelligence and job satisfaction was positively related between occupations. Furthermore, he found differences in job satisfaction that fitted his expectation – that job satisfaction was mediated by job complexity – and he suggested that there was a drift for intelligent people towards striving for jobs that were more complex. A high job complexity and level of prestige afforded to a particular job explains job satisfaction to some extent.

Socialization into work life starts at school. Summarizing different findings, Feij (1998) suggested that to be socialized into work and a company's climate and culture is very important for an employee (youngster) if they are to perceive job satisfaction and other positive work-related attitudes and a preferred behaviour. This process of work socialization starts in school and in the family.

Occupational level/achievement and occupational area.

Occupational level is a diffuse concept, but broadly described it is a measure of qualification demands for the occupation. Gerhart (1988), and Ganzach and Pazy (2001) concluded that subjectively measured and objectively measured job complexities may have implications for the interpretation of the results. For example, the measures consist of different characteristics and have different purposes. Another aspect is that an observer may have another opinion than the actor (employee) about job characteristics. As observer or supervisor, you may think a task is simpler than the actor (employee) does. However, the employee might have a self-serving bias. Of course, the observer may be wrong because he does not know the task sufficiently well or because of a

mechanism such as the fundamental attribution error. Therefore, in interpreting results relating to job complexity, one should consider whether it is self- or other-rated job complexity.

Job descriptions have advantages and disadvantages; some might be appropriate for men but not for women and vice versa. In a large Swedish study, different descriptions of job characteristics were compared. The descriptions were appropriate as classifiers under different circumstances. Härenstam, Westerberg, Karlqvist, Leijon, Rydbeck, Waldenström, Wiklund, Nise and Jansson (2000) found that sometimes work titles were best, especially for men (see Härenstam & Östlin in Härenstam et al, 2000). Socio-economic status could be useful occasionally (see Koskinen & Martelin, in Härenstam et al, 2000). Educational level was good in some cases to measure women's self-rated health (Arber, 1997). Finally, educational level, but with respect to socio-economic factors, could be useful (Mackenbach & Kunst, 1999). The descriptions' usefulness varied according to gender and purpose. In this licentiate thesis, SSK (Swedish Standard Classification of Occupations; SCB, 1996) was used. In some of the analysis, an elaborated form was used. It is based on the education that is needed to perform the job well.

It has been shown that occupational level and occupational area are important for job satisfaction. It has also been shown that a good person-environment fit is essential to having the employee experience job satisfaction (Holland, 1959, 1966). But which is most important when describing job attitudes: occupational level or occupational area? Kozlowski and Hult (1986) claimed that the context improved the relationship between work complexity and job performance more for staff engineers than for R&D engineers. Other results stated that women were more concerned about the horizontal dimension ("working in an area that they like"), and men were more concerned with the vertical dimension ("prestige level", see Lindroth, 1999; Farmer, Rotella, Anderson & Wardrop, 1998). Thus, both occupational level and occupational area are of importance for job satisfaction. In the present studies, both the influence of occupational level and occupational areas, as well as the combination of the two, are examined in relation to job satisfaction.

It is a complex task to divide the job market into different sectors. How this is done depends on the purpose. There is little research done that examines work attitudes and compares different outcome measures in different occupational areas. Therefore, a brief overview is given here. For instance, Mulinge (2000) compared private, public and semi-public sectors. When the allotment is based on gender, it may be divided according to where typical females or males work (such as in education, healthcare, science and technology), as in studies such as those by (Lindroth, 1999); Cooper & School, 1989) or where they atypically work, as in the study by (Brown, Eisenberg & Sawilowesky, 1979). For example, Brown et al (1997) studied women majoring in mathematics and engineering. They compared those who intended to work with maths education, a traditional female area, and those majoring in engineering and intending to work in a more non-traditional area. The two groups differed with respect to prestige, flexible working hours, the opinion of the other sex, expectations of success and self-concepts. Greenfeld, Greiner and Wood (1980) studied females working in male-dominated jobs. These women had more-masculine success attitudes and were educated to a higher level than women in comparative gender-neutral or feminine jobs. Govier and Feldman (1999) studied females and males in both female and male work settings. The authors suggested that the selection of employees was based on job demands, not

gender. Kirchmeyer and Bullin (1997) asked if feminine, masculine or androgynous gender attitudes were most common among more- or less-experienced nurses. The more experienced the nurse was, the more masculine attitudes she had. Those masculine attitudes were also higher valued than the other attitudes. This is more common in specific studies of a particular occupation than it is in studies of the whole labour market. The overwhelming purpose in this thesis is to examine the major parts of the labour market for both sexes, and therefore the allotment according to the ideas in the IDA project is used. The classification system used was adopted from Anderson, Magnusson & Dunér (1983), and Lindroth (1999), whereby the labour market was divided into the following sectors: Science-Technology, Industrial-Handicraft, Administrative work, Service, Human service, Education and “Other” (including farmers, work in the cultural field and other “independent” jobs).¹

The gender segregated school and labour market. A short explanation is given of the gender-typical vocational choices that women and men in Sweden still make. The sample in the studies at hand also made gender typical vocational choices (for example, see Lindroth, 1999).

One explanation for a segregated labour market might be different cognitive advantages for women and men. Halpern (1997) made an overview of the different causes of gender differences in intelligence. Among other things, she suggested that it was important that society not value males or females as more intelligent than their counterpart because both have cognitive advantages. Furthermore, she suggested that there were group differences between the sexes, but that this hid many individual differences – for example, boys who were verbally gifted or girls who were gifted in mathematics. She suggested that the school system ought to take into consideration the different mental “spurt” ages of pupils.

Since people select different jobs, and there is a gender-segregated labour market, this selection might be the result of self-evaluated capacities to manage different jobs. Pupils might have been reinforced in the school system by grades, and so on. Therefore, different ability profiles in women and men might influence vocational choice (Wulff, 2001). However, the relationship between ability and job satisfaction does not have to be influenced by different ability profiles in women and men. Job satisfaction per se does not have to be lower or higher because of different cognitive advantages in women and men.

Another explanation for the segregated labour market in Sweden is the school system, and the gender-typical educational choices students make. Jonsson (1997) examined gender differences in educational choices in the Swedish job market. In Sweden during WW2 and just after it, gender differences in exams from senior high schools started to diminish. In the 1990s, there were more women than men at university. Women were dominating in jobs as nurses, kindergarten teachers, and so on. These jobs did not have much status and the training for them was shorter than for the jobs men usually chose. More men than women had chosen to remain in education longer to take exams in engineering, economics, law and medical science. The average level of education is now almost equal for women and men. The author suggested some models to explain the gender-typical vocational choices women and men used to – and still do – make. The gender-typical vocational choices were explained by the fact that

¹ In the earlier IDA studies, the SSK code was not used.

the girl or boy wants to maximise life satisfaction. Girls and boys had different life goals, and comparative advantages, as well as different attitudes concerning family life and parenting versus work life. There may also be comparative advantages in ability and school grades. Jonsson (1999) argued that scholastic achievement was an explanation for gender-typical vocational choices. He concluded that in Swedish senior high schools "...the effects of variables measuring comparative advantages turned out to be strong, particularly for the most sex-typical programmes (techniques/engineering and the humanities)" (Jonsson, 1999, p 402). Jonsson's point of view (1997, 1999) might explain the gender-segregated labour market in Sweden. Does this have implications for job satisfaction? Here, it is argued that it may not.

Ability and job satisfaction in the context of other relevant factors.

To understand mechanisms behind vocational behaviour and job satisfaction – a number of theories have been suggested. In his review of vocational behaviour and research that had been extraordinary influential, Borgen (1991) highlighted the work of Holland and Super: Holland's work concerning job satisfaction and person-environment fit, and Super's concerning career planning. Both had the individual as an agent in the work environment, which has connections to Bandura's theory and similarities to the interactionistic perspective. Holland's work is most relevant to this study, and I therefore present some of his findings.

Holland (1959) wrote about the importance of person-environment fit for people to perceive job satisfaction. According to him, the labour market could be divided into a motoric sector, an intellectual sector, a supportive sector, a conforming sector, a persuasive sector and an aesthetic sector. People chose different sectors and jobs because of different developmental histories and self-knowledge (Holland, 1959). The occupational level was decided with respect to intelligence and self-evaluation. In this case, self-evaluation was "a function of socio-economic origin, need for status, education and self-concept" (Holland, 1959, p 38). Holland (1959) suggested that a person with a specific interest type best fitted in a congruent environment, an occupation, where the majority had a similar profile of interests and abilities. Those work environments had use of people with those specific abilities and interests. Therefore, to perceive job satisfaction, there is a need for person-environment fit.

In educational settings, person-environment fit may be of minor importance. Holland (1966) used two large college samples and tested his model in educational settings. He examined whether it was possible to use his model to predict the vocations the students would have. He obtained significant results in the classification structure, and some predictive power. Furthermore, there was good correspondence between "criterion" variables (such as life goals, abilities, personality and attitudes) and the vocational interest types (Realistic, Intellectual, Social, Conventional, Enterprising and Artistic). The model fitted better for men than for women, but the study showed that the model of person-environment fit is also valid in educational settings.

There may be sex differences in the model of person-environment fit. Anderson, Tracey and Rounds (1997) reported that Holland's RIASEC model (with the interest types Realistic, Artistic, Investigative, Social, Enterprising and Conventional) was a good model for both sexes. There were no gender differences in the fit of the model, and no major differences in the circular or circumflex RIASEC model. Furthermore, Farmer, Rotella, Anderson and Wardrop (1998) used Holland's theory to examine gender differences in the subjects' job descriptions (in Holland code) in a sample containing

subjects with careers in science, mathematics and technology. The authors suggested that men had higher prestige levels in their work than women. Furthermore, they examined the gender differences in the three-digit Holland code that described the subjects' jobs. There were only gender differences in the interest types Realistic and Social, and not in the other interest types. Women had the Social interest type in their first position more often in the Holland code than men. There were significant sex differences between the frequency of the Social and Realistic interest types. Maybe a suitable person-environment fit, and as a consequence, job satisfaction, could be reached even if a woman chose a more "masculine" job. Women do not have to be afraid of that, according to the authors, since Social interests exist in jobs that are more "masculine" as well. Holland's model seems to fit both sexes; although there may be some differences in Social and Realistic occupational areas, and in some cases in prestige levels. Holland's theories seem valid for both sexes. Sex differences occur occasionally when implementing the model, but are usually small.

As mentioned, organisational and personal fit is a positive thing. Brezt and Judge (1994) showed that a fit between the person and the organisation was important for job satisfaction, intention to stay, higher salary and occupational level. Furthermore, Judge, Heller and Mount (2002) discussed the Big Five and its relation to job satisfaction in a meta analysis. They summarized the results in the following way: neuroticism correlated $-.29$ with job satisfaction, conscientious $.26$, and extraversion $.25$. Altogether, the Big Five explained job satisfaction in a regression analysis rather well. According to the authors, there are no other studies connecting the Big Five to job satisfaction, so personality may contribute to job satisfaction.

Personality, ability and job satisfaction are interrelated. Can they be used as predictors of successfulness in recruitment decisions? Dunn, Mount, Murray and Ones (1995) studied the Big Five and general mental ability in relation to Holland's interest types. They had chosen six job types according to the Holland interest types (and categorised them according to DOT, Dictionary of Occupational Titles, US Department of Labor, Employment and Training Administration, see Dunn et al, 1995). The jobs were at the same complexity level. Dunn et al. (1995) found that conscientiousness and ability were the aspects that were most important in all six job types for a manager's decision to hire an individual. It seems some traits are essential for the employer when deciding between job applicants.

For a summary of the rationale in the present study, see Figure 1. Ability is believed to influence occupational level, occupational area and job satisfaction. Occupational level and area are also believed to influence job satisfaction, although not all influence of ability on job satisfaction is believed to go via occupational level and area.

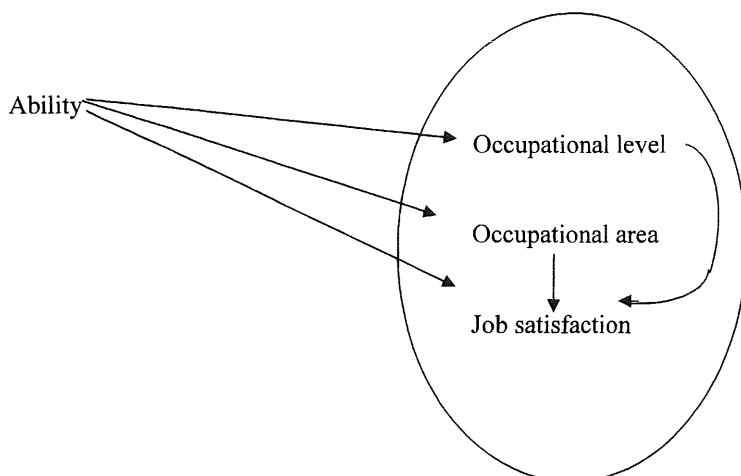


Figure 1. *The relation between ability and job satisfaction, considering also occupational level and area.*

Purpose

The purpose of this licentiate thesis is to examine the relationship between ability and job satisfaction. Naturally, education is important with regards to vocational choice, and vocational choice can have an impact on job satisfaction. It is obvious that many aspects interact in a complex manner in educational and vocational choices, and a variety of approaches are possible when examining the relationships between ability and job satisfaction. This licentiate thesis aims to deal with some of the aspects that can moderate this relationship, previous performance in school, occupational level, occupational area and possible gender differences. In addition, is there an optimal occupational level with respect to the individual's ability?

The specific purpose of Study 1 is to provide information about developmental aspects of the relationship between intelligence and satisfaction with school or work.

In Study 2, the focus was on how the relationship between ability and job satisfaction was moderated by occupational area and occupational level.

Method

Sample

The studies used data from the longitudinal research program Individual Development and Adaptation (IDA; Bergman, 2000; Magnusson, 1988). The sample consisted of about 1000 women and men. The dropout rate has been very low, 5-15% at a given age (Bergman, 2000; Magnusson, 1988).² *Sample in Study 1:* Data were used from ages 10, 13, 26 for both sexes, and at age 43 for women and age 48 for men. *Sample in Study 2:*

² *Acknowledgements.* This study was made possible by access to data from the longitudinal research program Individual Development and Adaptation (IDA). The scientific leader is Lars R. Bergman. Responsible for the planning, implementation and financing of the collection of data up to age 26 was David Magnusson. The data collection was supported by grants from the Swedish National Board of Education, the Swedish Committee for the Planning and Coordination of Research, The Bank of Sweden Tercentenary Foundation, the Swedish Social Research Council, and the Örebro County Council.

Data were used from ages 10 and 13 for both sexes, and at age 43 for women and age 48 for men.

Variables

For a more detailed description of the variables, the reader is referred to the studies. Here only a short overview is given.

Ability: Ability was measured by the Swedish DBA test (Differential Ability Analysis; Härnqvist, 1962). Data were used from ages 10 and 13.

School satisfaction: Items from pupils' questionnaires were used from age 13 and 16.

Satisfaction with work in young adulthood: At the age of 26, the questionnaire about work and education for young adults was used.

Job Satisfaction: Extrinsic and Intrinsic Job Satisfaction was measured using the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England & Lofquist, 1967).

School performance: School performance was measured by grades in Swedish and in mathematics. In Study 1, the concept "school achievement" is used instead.

Level of work at age 43 (women) and 48 (men): Occupational level was measured using the Swedish Standard Classification of Occupations (SSYK). In Study 1, work achievement as an indicator of occupational level is used instead.

Occupational area: The classification system used for occupational areas in the IDA project was adopted in this study. Lindroth (1999) elaborated the classification system. There are seven different areas where "1" indicates Technical/ Scientific work, "2" indicates Industry /Handicraft, "3" indicates Administrative work, "4" is "Others" that do not fit into other groups (such as farmers), "5" indicates Service sector, "6" indicates Human service, and "7" was used for Education.³

Procedures

In Study 1, correlations were computed between ability and satisfaction in school and work. Structural equation modelling was used to test a model of the relationship between ability, school and work achievement, and satisfaction with school and job. The LISREL program was used for this purpose (Jöreskog & Sörbom, 1996).

In Study 2, analyses of variance were conducted to compare means in job satisfaction and ability between different occupational levels and occupational areas. Analyses of covariance were also carried out with job satisfaction as the dependent variable and occupational level as covariate.

³In the earlier IDA studies, the SSYK code was not used.

Summaries of studies

Study 1, Intellectual ability and satisfaction with school and work: A longitudinal study from age 13 to 48.

Broadly speaking, most of the relationships were weak between, on the one hand, ability and school performance in grades six and nine and, on the other hand, job satisfaction in young adulthood and middle-age job satisfaction. There were some significant positive correlations between school satisfaction and ability at age 13 for all ability variables and for both genders. This was not the case at age 16. At the age of 26, there were a few negative correlations. At middle age, there were significant relationships for women between intrinsic job satisfaction and ability, and for men between extrinsic job satisfaction and ability.

In line with previous findings, ability was related to achievement (performance) and achievement was related to satisfaction. Therefore, this mediating role was examined. Gender differences are rarely studied with respect to the mediating role of performance with longitudinal aspects.

The weak correlations that were found at school age were in accordance with our expectations. At age 26, the weak negative relations were in line with the rationale of the study. By middle age, most people have entered a final vocation, and as expected, there were weak positive relations between ability and job satisfaction.

The developmental aspects and the mediating role of school achievement (school performance) and work achievement (occupational level) were tested in a structural equation model. The chosen structural equation model had reasonably good fit according to fit indices (RMSEA=.076; SRMR=.08; GFI=.87; NFI=.91; AIC=1433.38; PNFI=.88).

According to the model, the ability at age 10/13 predicted both school and work achievement. This, in turn, predicted school and job satisfaction. Thus, the relationship between ability and job satisfaction was mediated by achievement. The same model fitted both sexes. School achievement in grade six was very important for school achievement in grade nine, which in turn was strongly related to work achievement in adulthood. Satisfaction in grade six was indirectly related to adult satisfaction via satisfaction in grade nine.

The effect of ability on school achievement in grade nine was indirect via school achievement in grade six. These results suggested that work achievement is important for satisfaction. A positive experience of school may promote a better work life in adulthood.

The results, especially in middle age, must be considered with respect to Swedish conditions. Sweden is a comparably equalitarian society with regards to female participation in work life, females with higher education, and minimal income differences between classes and sexes. In a sample from another society, the results might differ.

Study 2, Job Satisfaction and ability in relation to occupational area and occupational level.

There were significant mean differences in job satisfaction and ability between different occupational levels (work achievement) for both genders. Overall, management had high means in job satisfaction and work requiring no education had low means. In general, the correlations between ability and job satisfaction were non-significant in different occupational areas and occupational levels.

Overall, women in the service area had the highest job satisfaction, those working in the human service area had among the lowest extrinsic job satisfaction, and those working in industry/handicraft had the lowest mean in intrinsic job satisfaction. Females in administrative work had among the highest ability and those in industry/handicraft area had low ability.

For males, there were differences across occupational areas only in extrinsic job satisfaction and ability. Those who worked in administrative work had the highest job satisfaction, while those working in industry/handicraft had the lowest job satisfaction and the lowest ability. The highest mean in ability was that of men working in the technical/science area.

When mean scores in job satisfaction were compared between different occupational areas, while controlling for occupational level, there were significant differences in extrinsic job satisfaction according to occupational area, and a significant interaction between gender and occupational area. Women in the service sector had the highest adjusted mean and women in the human service area had a lower mean than women in many of the other areas. Males working in administrative work had a higher adjusted mean than those in the other areas.

With regards to intrinsic job satisfaction, women with the highest mean were found in the service sector. Women working in industry/handicraft had among the lowest means. For men, those working with human services had the highest intrinsic job satisfaction; the lowest adjusted mean belonged to those in the technical/science field.

Overall, tests of the non-linearity in the relationship between ability and job satisfaction showed no significant results with respect to different occupational levels/occupational areas.

The final question was whether there was an optimal ability level for each occupational area. This could not be confirmed. However, females that were overachievers had higher intrinsic job satisfaction by age 43 than those who worked at a level corresponding to their capacity, or at too low a level. For males at age 48, overachievers had the highest job satisfaction.

Discussion

There are few studies examining longitudinal relationships between ability and school satisfaction from childhood, and job satisfaction in adulthood, for different occupational levels and areas. Such issues are the focus of the present licentiate thesis.

Is ability important for job satisfaction?

In this licentiate thesis, ability has been shown to be weakly related to job satisfaction. On the other hand, occupational level has been shown to be more strongly related to job satisfaction, and ability related to occupational level. To some extent, different ability mean scores were also seen in different occupational areas. The relationship between ability and satisfaction was also weak when different occupational levels and areas were taken into account. This might be unexpected but is in accordance with our hypothesis.

There were divergent findings in the relationship between ability and satisfaction in childhood and in young adulthood. In Study 1, some significant but weak positive correlations were found between ability and school satisfaction, as is supported in previous research (Ablard, 1997). However, in young adulthood, there were only a few weak negative relations between ability and job satisfaction. One reason for this might be that most of the study participants had just entered the labour market and had not yet obtained a job appropriate to their ability level and qualifications; Handschin (1996) reported a similar finding. As was just mentioned, the relationship between ability and satisfaction varies between childhood and young adulthood; what happens in middle age?

At middle age, there were some significant positive relationships between ability and satisfaction. Further analyses indicated the possibility that the relationship is mediated by occupational level (work achievement), as is seen in the structural equation model. In Study 1, the SEM model for the relationship between ability, achievement and satisfaction showed that school achievement (school performance) was related to work achievement (occupational level) in midlife. A longitudinal impact was discovered, in that school experiences predicted job experiences. School achievement and work achievement were related to school and job satisfaction. Ability, in turn, was related to school and work achievement. The relationship between school achievement and school satisfaction, as suggested in the present licentiate thesis, is not shown in all research. Diedrich and Jackson (1969) did not find higher performance among satisfied or dissatisfied pupils. According to the structural equation model in Study 1, school satisfaction was related to job satisfaction, and the relationship between ability and job satisfaction was mediated via work achievement. The importance of occupational level (work achievement/job complexity) is supported by previous research (see Ganzach, 1998; Ganzach & Pazy, 2001, Ganzach 2003).

In some respects, occupational level (work achievement/job complexity) is mirrored in performance. It has been claimed that the effort an individual puts on this performance is influenced by the value he puts on the expected rewards, his role-perception and ability (Lawler, 1966; Hackman & Porter, 1968; Lawler & Suttle, 1973). In this context, it is worth mentioning that the subjects in the study at middle age had established work lives (Isaksson, Johansson, Lindroth & Sverke, 2000; Näswall, Sverke, Isaksson, Johansson & Lindroth, 2000; Trost & Bergman, 2004). It may also be considered that people at that age have lower expectations with regards to work, and are more preoccupied with other interests and life goals (Nurmi, 1992), and therefore feel satisfied with their job because it gives them the opportunity to do stimulating things in

their spare time (see Spokane, Meir & Catalano, 2000). For instance, Holland (1959, 1966) stipulated it was important to match personality to work environment in order to achieve job satisfaction. The results from this licentiate thesis broadly showed that an increasing ability level was seen with increasing occupational level, and that occupational level (work achievement) mediated the relationship between ability and job satisfaction in middle age.

It was argued that intelligence contributed to performance and in Study 2, it was initially predicted that: "The higher the intelligence level, the easier it is to manage job demands and to produce higher quality job." As expected, the results showed that in jobs that demanded higher qualifications, workers were more intelligent than those in jobs that demanded less education. Of course, this was on a group level, which hides individual differences. This is, of course, not a new finding (see Brody, 1997; Cesi & Williams, 1997; Ganzach, 2003; Huang, 2001). Intelligence as one of the factors necessary to succeeding in a more demanding job is also discussed by (Holland, 1959; Sternberg 1997). According to Zeidner (1995), intelligent people have better coping and adjustment possibilities, which may enhance performance. Of course, there may be other facilitating matters that help an employee to adjust, such as successful socialisation in the workplace (Feij, 1998). It seems obvious that these sorts of factors can be important for job satisfaction.

There are theories that pinpoint the importance of ability, and its different aspects, with regards to perceive job satisfaction. There are also theories that look at the importance of personality and/or specific knowledge to achieving job satisfaction. Ackerman (1996), in his PPIK theory, showed that different knowledge domains were related to specific abilities. According to the results in this licentiate thesis, both interests and abilities may be involved in job selection. In this study, general ability was mainly used, since there were only small differences in correlations between different types of abilities and job satisfaction.

The person-environment interaction aspect of intelligence has some implications. Matthews' (1995) model involving cognitive factors in personality, in a reciprocal relation to environmental factors, explained the relationship between personality and skill as stated in the introduction section. It highlights the importance of the interaction between the person's ability and the environment, how he selects and acts/reacts to his environment, as in Sternberg's definition of intelligence (1997). However, it could be argued that emotions would be important in this matter, and Sjöberg (2001) found that emotional intelligence was important for life adjustment, but that it was not related to work motivation or job satisfaction. Again, there is some support for the discussion of interaction with respect to a person's ability and environment.

Job satisfaction and ability in different occupational levels and occupational areas.

In this licentiate thesis, it is suggested that occupational level per se is important for job satisfaction, but it was reported that the relationship between ability and job satisfaction within different occupational levels was often non-significant. There were gender differences in ability and job satisfaction, but they were small.

In Study 2, we could not demonstrate an increasing mean level in job satisfaction with increasing educational level, but the results generally suggested that a higher level of education was related to a somewhat higher level of job satisfaction, as has also been found by (Hyllegard & Lavin 1992). They wrote about how education was necessary to getting more-rewarding work and thereby improving an individual's SES. Finally, job

satisfaction may vary across occupational areas even when occupational level is controlled for. This may be a reflection of interest and motivation.

In Study 2, the following prediction was examined: “The impact of intellectual ability on job satisfaction can be expected to vary according to both job area and job level.” This was also confirmed. However, an ANCOVA (with occupational level as covariate) showed no sex differences in extrinsic job satisfaction, whereas there were differences in intrinsic job satisfaction. The administrative work sector had high means in job satisfaction for both sexes; people had high education and management positions. This is in accordance with the hypothesis that a high occupational level is associated with high job satisfaction (see Gazach & Pazy, 2001; Hyllegard & Lavin, 1992). People may be more satisfied in occupational areas with high educational demands than in areas with low educational demands.

Non-linearity and an optimal ability level for each job level.

In the present licentiate thesis, both linear and non-linear models were applied when studying the relationship between ability and job satisfaction. No evidence was found to indicate that the relationship between ability and job satisfaction was non-linear.

However, ability is important for occupational level. Ability is almost linearly related to occupational level, and occupational level seems to be important for job satisfaction for both genders. The importance of job complexity/occupational level has been reported previously (for example, see Ganzach & Pazy, 2001; Hyllegard & Lavin, 1992). Using regression analysis, Tatsuoka and Cattell (1970) concluded that a person’s adjustment to a job is predictable. Maybe there is to some extent a “right” personality for an occupation, one that is necessary to be able to experience job satisfaction in that occupation, as has been suggested elsewhere.

The results in this licentiate thesis are partly in line with what to expect from Holland’s theories. A discrepancy was that we showed (in Study 2) that overachievers were more satisfied with their work than normal or underachievers. This finding was contradictory according to the initial hypothesis, which, in line with the literature, suggested that there ought to be a balance between a person’s intelligence and work demands to achieve maximum job satisfaction (for example, Holland, 1959). Across occupational areas, overachievers were more satisfied.

Gender differences

In Study 1, the same SEM model fitted both women and men, indicating that there were no sex differences. However, it was not taken into account that women and men worked in different sectors of the labour market. Which sex differences existed in different occupational areas? Men in the area of administrative work showed high job-satisfaction, and women in the service area had high mean scores in job satisfaction. The largest number of management occupations was concentrated in the administrative work area. There were more men than women in those positions. Management is often associated with a higher salary and status, and status is an incentive, especially for men (see Moore, 1985). Females working in industry/handicraft had the lowest intrinsic job satisfaction. Females perceived extrinsic job satisfaction to be divergent in different occupational areas. In contrast, men working in industry/handicraft had the lowest extrinsic job satisfaction and those in administrative work the highest, as mentioned earlier. These findings may, in part, be because the industry/handicraft area has a low educational demand, and the administrative work area has higher educational demand.

Anderson et al (1997) found no gender differences in Holland's model. On the contrary, Farmer, Rotella, Andersson and Wardrop (1998) found differences in the Realistic and Social interest types, but not in the other interest types in the Holland code. Women worked in jobs that were more social. In this licentiate thesis, we could see differences as we subdivided the occupational area into different sectors. The previously mentioned ANCOVA (with occupational level as covariate) showed sex differences in intrinsic job satisfaction across occupational areas.

In this context, the impact of gender stereotypical vocational choices on the results should be recognized. Jonsson (1997, 1999) concluded that vocational choices in Sweden were very gender stereotypical. For our sample it was also found that men and women made gender-typical vocational choices; for instance, in the human service area and the community area, women workers were more common than men (Lindroth, 1999), and vice versa in the science/technical area. To conclude, there were mostly small or non-existing gender differences in job satisfaction, perhaps with the exception of differences between occupational areas. However, these results might depend on the fact that we have a segregated labour market.

In ability, there was some variation between the females and males across occupational areas. It seemed that men showed more variety in ability across occupational areas than women.

Limitations

In this licentiate thesis, most analyses were carried out using a measure of general ability. This was done because similar results were obtained from correlation analysis for verbal, inductive, spatial and general ability. Ability consisted of verbal, inductive and spatial intelligence measures. Intelligence measures were used from the ages of 10 and 13, and intelligence scores from those ages are relatively stable into adulthood, but it should be recognized that the general ability measure that was used is rather conventional, for instance, it does not deal with practical intelligence. Practical intelligence ought to be important in practical jobs, such as those in the handicraft and industry area.

The zeitgeist might influence the results. This licentiate thesis builds on data for women and men about the age of 45, born in 1955. Other generations might have other ideals and priorities concerning work and family life than those in the present study. New habits among young people today might also foster other attitudes towards work life. Thus, if a replication is carried out on a more "modern" cohort, the results might be different.

Occupational level or work achievement is a diffuse concept and was here almost identical to the educational level the job demanded. If, as an example, salary was used as a measure of job complexity or occupational level, the results might be different. Because of group sizes, occupational levels were sometimes collapsed, but this has probably been of minor importance for the results.

Implications and conclusions

The results from the licentiate thesis have both a theoretical and a practical value. From a theoretical point of view, a contribution has been given to our understanding of the relationship between ability and job satisfaction. The SEM model, with the stated relations between the two concepts, is a platform for future studies. It is not common to divide the whole occupational area into sectors and to study ability and job satisfaction

in each sector, both with and without controlling for occupational level. Furthermore, this was a longitudinal approach taking more of a lifespan perspective.

Performance/achievement/occupational level is related to job satisfaction. This is partly in line with the expectancy theory, in that performance is influenced by the expectancy of rewards (Lawler, 1966; Hackman & Porter, 1968; Lawler & Suttle, 1973). In this licentiate thesis, a high occupational level is related to a high educational level, as mentioned. Furthermore, it is argued that people who are more ambitious desire a more demanding job where they gain to make a greater effort to get higher job satisfaction.

Previous research (such as Dunér, 1972; Kvist & Söderlund; 1979; Lindroth, 1999; Nurmi, 1992; Feij, 1998; Price, 2002) suggested that an individual's vocational choice, dreams and aspirations start during childhood. Somewhat related to this is the finding in Study 1 that ability is strongly related to early school performance, both in a direct way and indirectly to adult occupational level. As mentioned earlier, achievement and satisfaction are related. Practically, the results could be useful in planning work and school policies. In Sweden, the aims in compulsory and senior high school are to educate pupils to become members of society and to reach the required level in a variety of school subjects. The value of the more social aspects has sometimes increased and the value of the more traditional education decreased. More could be done to help pupils with special needs (pupils who have difficulties or who perform extremely well, those who are not in the mainstream). Since occupational level was found to be as important for females as for males for job satisfaction, the results also have implications from a gender perspective, for equal opportunities for females and males in work life and the educational system. In Sweden, such matters are discussed among politicians and the media more than in many other countries.

Furthermore, the results point to the importance of organisational research concerning job enrichment and empowerment. Job enrichment is important because it is beneficial for people to work in jobs in which they have the possibility to grow. Empowerment, to give voice to the employee (Speitzer, 1996), ought to be good for both the employee and the company. However, although job enlargement is good most of the time, it is not always so. Conger and Kanungo (1988) reviewed the concept of empowerment. Good management and leadership would take away difficulties for subordinates to feel self-efficacy. Self-efficacy enhances performance among subordinates. According to the authors, there ought to be a greater overlap between Bandura's theories (Hjelle & Ziegler, 1988) and psychology. Self-efficacy, a just reward system and a positive feedback dialogue with employees would enhance job performance. However, empowering subordinates is not good if they do not have the capacity to take care of more-important tasks. This licentiate thesis highlights the importance of a high enough occupational level to perceive job satisfaction.

The major differences between the occupations were in ability. Some occupational areas have a need of highly qualified people. However, most groups might perceive job satisfaction. In our information society, the growing need for well-educated people is apparent, as is also discussed by (Huang, 2001 Aronsson, 1997). Huang (2001) questioned "The Bell Curve" by Herrnstein and Murray – for example, their way of selecting high-IQ subjects and occupations. Furthermore, he was critical of their suggestion that verbal ability becomes more concentrated in those occupations over time. Huang (2001) suggested: "People compete for high-paying and prestigious positions, such as positions in high-IQ occupations, but those who have high IQs are

more likely to get these jobs. Therefore, a high concentration of high-IQ persons in one particular occupation does not necessarily suggest that this occupation must involve a high degree of work complexity and that only persons with very high IQs can meet the cognitive demands” (Huang, 2001, p 540). Huang (2001) also concluded that intelligence was not the only thing that explains success in work life – socio-psychological factors and education contributed as well. It follows from the fact that work life is constrained by supply and demand of different kinds of jobs, that ability may be a too narrow concept as a selection tool.

A somewhat related issue to how well people succeed in the jobs they choose is the allocation of the workforce and the selection system. According to Wagner (1997), a system that measures prior job performance, experiences, training and IQ might be fair, and may be helpful for minority groups. In Sweden, besides ability and knowledge, social networks influence the individual’s chances to get a job that suits him.

Job satisfaction has a multi-factorial explanation. This licentiate thesis showed that ability is one of the contributing factors, but not a very important one. It seems reasonable to suggest that, for example, to have a job that is perceived as demanding and as a challenge is of greater importance for job satisfaction than ability. Examining such factors that operate in work life and promote job satisfaction merits further investigation.

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Study 1
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Intellectual Ability and Satisfaction with School and Work:

A Longitudinal Study from Age 13 to 48.

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Abstract

Although it has been held that intelligence may affect the adjustment process, few studies have examined how intellectual ability is related to an individual's sense of satisfaction with school and work. The present study investigated the importance of intellectual ability for the development of school and job satisfaction, using a Swedish sample of about 1000 men and women who were studied longitudinally from the age of 13 to middle age (43 years for women, and 48 years for men). The findings showed that intelligence had a weak positive correlation with school satisfaction at age 13, but not at age 16, and that it tended to have a negative relation to job satisfaction at the age of 26. Adolescent ability levels were associated with greater intrinsic job satisfaction for women and greater extrinsic job satisfaction for men at middle age. Longitudinal structural equation modeling indicated that the effects of ability on school and job satisfaction were mediated by school and work achievement respectively. The same model fitted both sexes.

Keywords: Ability, school satisfaction, school achievement, job satisfaction, work achievement, longitudinal

Intellectual Ability and Satisfaction with School and Work:

A Longitudinal Study from Age 13 to 48.

1. Introduction

The developmental process of adjustment to school and work is a complex, interrelated process that may best be viewed from an ecological, systematic perspective that takes into consideration the importance of individual as well as contextual factors (Bronfenbrenner, 1999). Such an approach is illustrated by Super's life-span, life-space model (Super, 1957, 1980; Super, Savickas, & Super, 1996), which has been one of the most influential theories on work and life development. This theory is based on the premise that individual differences (in ability, personality, needs, values, etc) are central to the ways in which people construe their lives. While individuals' self-concepts as well as vocational preferences and experiences tend to change over time, they appear to be more stable from adolescence until midlife (Super et al., 1996). According to the theory, satisfaction with life and work is influenced by the extent to which individuals feel they can utilize their resources and interests, and whether they are able to live in agreement with their self-concepts.

Previous research indicates that having a good match between individual attributes and environmental demands can enhance the possibilities of adjusting to situational demands. With individuals relying on both their cognitive and emotional capacities in order to cope well in their environments (Lazarus, 1991), intelligence may be a decisive factor in attaining achievement and satisfaction at school as well as in working life (Brody, 1997; Cesi & Williams, 1997). Indeed, according to Sternberg (1997),

"Intelligence comprises the mental abilities necessary for adaptation to, as well as shaping and selection of, any environmental context" (p. 1030). It is well-documented that mental ability is associated with both school achievement (e.g., Kulik & Kulik, 1982) and work achievement (e.g., Bertua, Anderson, & Salgado, 2005; Salgado, Anderson, Moscoso, Bertua, de Fruyt, & Rolland, 2003). There is also research which suggests that cognitive ability is related to satisfaction with school (e.g., Schmitt, Oswald, Kim, Imus, Merrit, Friede & Shivpuri, 2007) and work (e.g., Ilies, Arvey & Bouchard, 2006). An interesting observation, from a developmental point of view, is that school achievement is related to subsequent job performance (e.g., Roth, BeVier, Switzer, & Schippmann, 1996). However, even though satisfaction and performance appear to be intimately related (see, for instance, Iaffaldano, & Muchinsky, 1985; Judge, Thoresen, Bono, & Patton, 2001), and despite the fact that childhood ability has implications for subsequent working life (Dunér, 1972, Feij, 1998; Price, 2002), the potential mediating role of school and work achievement, respectively, in the relations between ability and school and job satisfaction has received only limited attention (Ganzach, 1998; Ganzach & Pazy, 2001). In addition, sex-related differences in the relationships between ability and achievement and school or job satisfaction have also received little study.

The overall aim of the present study is to address certain aspects of the process of school and work adjustment from a developmental perspective. More specifically, by using a Swedish sample of about 1000 men and women who were followed longitudinally from age 13 to middle age, we focus on the relationships between intelligence, achievement and satisfaction in school and work from a longitudinal perspective.

1.1 Intelligence, achievement, and satisfaction with school

Satisfaction with school and work, which is central to the present study, falls in the area of intrinsic adjustment, according to Magnusson, Dunér and Zetterblom (1975), who drew a distinction between the intrinsic and extrinsic aspects of adjustment. They defined intrinsic adjustment as “the agreement between the individual’s needs, motives and evaluations on the one hand, and on the other, the rewards he gains as experienced by himself” (p.22). As mentioned earlier, it is reasonable to expect there to be a positive relationship between performance and satisfaction. Pupils who perform well at school would – all things being equal – probably tend to be more satisfied with school than those who perform less well (e.g., Dunér, 1972; Magnusson, Dunér & Zetterblom, 1968).

Since ability is related to school achievement (La Paro & Pianta, 2000), it can also be expected that intelligence enhances satisfaction with school. For instance, Schmitt et al. (2007), using cluster analysis, found that in clusters comprising students with higher ability (based on SAT scores), college grades, adjustment, and satisfaction were often higher than in low ability clusters. In the meta-analysis by Kulik and Kulik (1982), it was shown that in ability-grouped classes, high-ability students performed better as compared to average and below-average students and, moreover, that class grouping was more likely to generate positive school-related attitudes. Thus, on the surface, it can be argued that the more intelligent students would feel more at home and enjoy school more than pupils of lower intelligence.

However, some studies paint a more complex picture. It has been found, for instance, that bright pupils sometimes have difficulties adjusting at school (e.g., difficulties in social relations), when compared to normally gifted pupils (Ablard, 1997). Chapman and McAlpine (1988) reported that intelligent pupils were not more satisfied with school than pupils of average intelligence. However, Diedrich and Jackson (1969) found no significant relationships between school satisfaction and ability in a study of high school students. In these studies, neither sex-related differences nor different abilities were usually studied. Our conclusion is that the relationship between intelligence and school satisfaction in a developmental context merits further investigation.

1.2 Intelligence, achievement, and satisfaction with work

Although a number of factors may be predictive of job satisfaction (see, for instance, the meta-analysis by Brown & Peterson, 1993), it could be argued that the process towards work socialization starts as early as childhood (Feij, 1998, 2002). The different interests of children are of importance for their later vocational choices, as are their skills, and the opinions they have of their own capacities and knowledge of different jobs (Dunér, 1972). Ilies et al (2006), in their review concerning the influence of behavioral genetics on organizational psychology, even concluded that there was a component of heritability in both cognitive ability and job satisfaction. Price (2002) theorized about the factors that support the transition from school to work. According to his model, ability contributes to the outcome of the transition process, which could result in a suitable job and job satisfaction.

There are several reasons why ability would be related to satisfaction. Like an individual's personality characteristics and personal resources, ability is an important

factor in the meeting of job demands. It could be argued that intelligent people have better resources for handling their educational and work environments in ways that fit themselves, compared to people of lower intelligence. Hence, more intelligent people might have high job satisfaction. However, the relationship between intelligence and job satisfaction has a more complex etiology than that.

As for the ability-achievement-school satisfaction relationship, it is reasonable to assume that the effect of ability on job satisfaction is mediated by work achievement. Already in 1943, Strong observed that certain personal characteristics, such as intelligence, varied between different occupations. Along similar lines, Bozionelos (2004) has suggested that general mental ability is associated with extrinsic career success, operationalized as the organizational grade at which a person enters an organization. Handschin (1996) suggested that self-perceived abilities might have an influence on vocational choice, and applied Dawis and Lofquist's (e.g., Dawis, 1996) theory of work adjustment – which holds that "...correspondence between a person's abilities and the ability-requirements of the job is necessary to achieve tenure on the job" (p.5). Handschin (1996) found significant differences in the mean level of job satisfaction, depending on the vocational guidance intervention in the two-year follow-up. Those who overestimated their own ability were the ones who had the greatest rise in job satisfaction, since they often switched to jobs that were more in congruence with their ability.

Such arguments emphasize the importance of person-environment fit, and can be traced back to Holland's (1959, 1966) theory about vocational development, which highlighted

the notion that different demands have to be satisfied in different occupations. According to Holland, there has to be a match between job demands, knowledge, personality, and ability in order for a person to be satisfied at work. In a meta-analysis, Spokane, Meir and Catalano (2000) showed that such fit, based on Holland's RIASEC model (the model with the interest types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional), is important for the perception of job satisfaction. For example, a Realistic personality type would fit well in a realistic work environment and thereby be satisfied. Toth (1999) examined the relation between such variables as interests, personality, work values, ability, and job satisfaction, using mostly self-reported data. She found that personality, ability, and interests differed among subjects belonging to different RIASEC types, and also that, for some of Holland's personality groups, ability was negatively related to job satisfaction. Overall, her results showed only small differences between the sexes.

Other research has more explicitly examined the potential mediating role of occupational achievement in the relation between ability and satisfaction. Ganzach and Pazy (2001), for instance, using a cohort from the National Longitudinal Survey of Youth (NLSY), measured vocational complexity through both self-evaluations (Incumbent Perception of Job Complexity, derived from Sims, Szilagyi and Keller, 1976) and objective ratings by DOT (Dictionary of Occupational Titles, DOT; Roos & Treiman, see Ganzach, 1998). Intelligence, education, and age were found to predict vocational complexity. Despite observing a negative direct relation between intelligence and job satisfaction, intelligence and vocational complexity were found to be positively related, which created an indirect positive relation between intelligence and job

satisfaction. Ganzach and Pazy (2001) concluded that, for intelligent people, job complexity is important for job satisfaction. Similarly, Loundsbury, Gibson, Steel, Sundstrom and Loveland (2004) found that intelligence contributed to career and job satisfaction for individuals in managerial positions, while identifying negative relations for those in non-managerial positions. This provides further support for the mediating role of job complexity in the relation between ability and job satisfaction.

1.3 Purpose

The purpose of the present study is to contribute to our understanding of the developmental aspects of the relationship between intelligence and satisfaction with school and work. Broadly speaking, it is assumed that the higher the intelligence, the more easily the person adjusts to the demands of the system, and in so doing receives rewards and achieves some protection against failure and negative evaluations. This can be expected to contribute to a positive relationship between intelligence and satisfaction, which is mainly mediated by school and work achievement.

At age 26, when many are working in their first jobs, which are also often below their optimal achievement level, the relationship between ability and job satisfaction should be shown to be weaker and possibly even negative. By middle age, most are on their final career track and, for many, the achievement level of the job has increased. A positive relationship of intelligence to intrinsic as well as extrinsic job satisfaction would therefore be expected. At all ages, it is suggested that this relationship should decrease or vanish when achievement is controlled for.

Based on the available literature, and due to the fact that fewer opportunities exist for women than for men to achieve their “optimal” career (Huang, El-Khoury, Johansson, Lindroth, & Sverke, in press; Lee, 1994), it is to be expected that many women are working at a level that is too low in relation to their intelligence and, likewise, not enjoying positions or salaries that correspond to their intelligence. These conditions could underlie a weakening of the relationship between ability and satisfaction for women as compared to men, especially at middle age. Since the importance of intrinsic job rewards in relation to extrinsic rewards often seems to be higher for women than for men, it is plausible to expect that for women the relationship between intelligence and satisfaction will be higher for intrinsic job satisfaction than for extrinsic job satisfaction, and vice versa for men. In addition to this, at age 26, men often hold temporary jobs that are below their competence level, which suggests that there should not be a sex-related difference in regard to the relationship.

With few studies having examined the relationships of the different abilities to school and job satisfaction, we began by studying the verbal, inductive, spatial and general abilities separately in order to investigate whether there were any differences to be found between the different abilities. We did expect stronger relationships between verbal or inductive ability and satisfaction, than between spatial ability and satisfaction, since, in many contexts, the first two abilities are assumed to be more important for achievement.

Altogether, the set of our expectations have been used to formulate a structural equation model for examining the longitudinal relationships between intelligence, school

achievement/work achievement, and satisfaction (see Figure 1). In this model, possible sex-related differences are also examined.

2. Method

2.1 Sample and cultural setting

This study uses data from the longitudinal research program titled Individual Development and Adaptation (IDA; Bergman, 2000; Magnusson, 1988). The project began in the middle of the 1960s, and is based on an entire school grade cohort of children from the Swedish city of Örebro. For both sexes, data was collected at ages 10, 13, 16, 26 and in middle age – for women at age 43 and for men at age 48 (both data collections were very resource demanding and it was not possible to carry them out at the same time). For many purposes, the IDA sample can be considered reasonably representative of other Swedish cities (Bergman, 1973). At the age of 10, a total of 517 boys and 510 girls were studied. Through the years, the drop-out rate has been very low, 5-15 percent at any given age (Bergman, 2000; Magnusson, 1988).

In Sweden, nine years of schooling is compulsory, and most pupils continue their education with three more years of voluntary senior high school, which entitles them to go on to the university. Young adults tend not to think of starting a family until relatively late, with the average age of first-time mothers being 28.9 years, and first-time fathers being 31.4 years. The typical Swedish family and work pattern differ somewhat from what is found in most other European countries (Gonäs, 1999) and in North America. In Sweden, institutional day-care is the norm and almost all women, even those with small children, work at least part time outside the home. With most

women working, although fewer in high-prestige positions than men, parents can both share the time given for parental leave, which equals about 15 months of full-time work and is paid for by the state (Gonäs, 1999). According to Albrecht, Edin, Sundström and Vroman (1999), women who experience a disrupted career due to parental leave do not appear to suffer a decrease in wages in the long term in Sweden. In contrast, men's wages tend to end up lower if they partake in parental leave. In contrast to many other countries, salaries are comparatively equal between the sexes, and there are also comparatively small differences between salaries for blue-collar and white-collar workers. However, as in most other countries, the labor market is segregated, with certain jobs typically being filled by women and others typically by men. In regard to the unemployment rate, it is fairly low in Sweden; for women aged 43, 4.5 percent were unemployed in 1998 (SCB,1998), and for men aged 48, 4.1 percent were unemployed in 2003 (SCB, 2003)

Table 1 presents the basic demographic information for the IDA sample and for Sweden in general. This shows that, broadly speaking, the demographics of the IDA sample are fairly similar to those of Sweden in general, with a notable exception being that having a higher education is more common for the IDA sample than for Sweden in general.

Table 1 in about here

2.2 Variables

2.2.1 *Ability*. Ability was measured by the Swedish DBA test (Differential Ability Analysis; Härnqvist, 1962). It was carried out when the pupils were 10 and 13 years of

age. Four different ability scores were used: verbal, inductive, spatial, and general intelligence. According to Härnqvist (1962), the reliabilities are about .90 for the verbal, inductive and spatial abilities; and .95 for general ability. For each ability, the *T*-standardized age 10 and age 13 scores were averaged. The final score was then *T*-standardized. If the ability measure was missing from one age, the other one was used. Unfortunately, in the IDA longitudinal data base, only the total scale scores were retained, and therefore no reliability estimates can be given for the present sample. In most analyses, a measure of General Ability was used. It ranged from 15.15 to 80.76 ($N=1178$).

2.2.2 School satisfaction. Items from pupils' questionnaires at ages 13 and 16 were used to measure satisfaction. For each age, the scale was constructed in the following way. Firstly, an item pool was selected from the questionnaire which consisted of all items that were considered to measure satisfaction (e.g., "Do you think it is hard work in school?"). The answers were scored on a five-point scale where 1 indicated low satisfaction and 5 high satisfaction. An item sum was then calculated and correlated with each item. Items with $r > .30$ were retained and figured into a new item sum, which was in turn correlated with all of these retained items. Thereafter, items with $r > .30$ were used to construct the new scale. This last sum was divided by the number of items and constituted the scale. When necessary, the item scores were reversed to ensure that a high score indicated high satisfaction. If the answer to only one item was missing, the scale value was computed by calculating the mean of the answers to the valid items. In this way, two scales were constructed, measuring school satisfaction at age 13 (30 items, $\alpha = .88$) and at age 16 (8 items, $\alpha = .74$). The indexes were *T*-standardized. The

index of school satisfaction at age 13 ranged from 16.71 to 74.55, $N=1006$. The corresponding figure for age 16 ranged between 16.10 and 74.00 ($N=1079$).

2.2.3 Job satisfaction. Satisfaction with the present work was measured at age 26 using four items from a questionnaire on work (e.g., “How satisfied are you with your job tasks?”, with response alternatives ranging from 1 [low satisfaction] to 4 [high satisfaction]). The mean of these items represents the job satisfaction score at age 26 ($\alpha = .65$), and was subsequently *T*-standardized (ranged 45.41 – 62.94, $N = 928$). At middle age (43 years for women; 48 years for men), intrinsic (12 items, $\alpha = .86$) and extrinsic job satisfaction (6 items, $\alpha = .82$) were measured using the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England and Lofquist, 1967), with response alternatives ranging from 1 (very dissatisfied) to 5 (very satisfied). Again, the mean score was ascertained, and the same standardization and imputation procedure as for school satisfaction was applied. The index for intrinsic job satisfaction ranged from 7.85 to 69.49 ($N=775$), and for extrinsic job satisfaction, it ranged between 23.29 and 71.76 ($N=764$).

2.2.4 School achievement. School achievement, in the form of school performance, was measured using school reports on the subjects of Swedish and Mathematics at ages 13 and 16 (from register data). The scores ranged from 1 to 5, where 5 is the top grade. At age 16, only students from classes preparing for senior-high school were studied ($N=607$) because there were two courses of different lengths in Mathematics and the grades were not comparable. No imputation was conducted for school achievement, and the raw scores were *T*-standardized. School achievement at age 13 ranged from 29.20 to

68.40 ($N=1092$). The corresponding figures for age 16 ranged from 28.60 to 70.70 ($N=1152$).

2.2.5 Work achievement, age 43/48. It could be argued that the higher prestige level an occupation has, the better the individual in that occupation has succeeded in work life. In this study, the level of work is seen as a kind of work achievement. Work achievement was measured at age 43 (women) and age 48 (men), using the Swedish Standard Classification of Occupations (SSYK). SSYK, which is a code for the classification of different vocations and jobs, is the Swedish version of ISCO-88 (COM) (International Standard Classification of Occupations 1988, the version for the EU, originating from the International Labor Organisation, ILO). It consists of a four-digit code, where the first digit shows which level of education is needed to perform the job well. A more elaborate version of SSYK was used in the present study, with 1 indicating almost no education or an education not higher than senior high school level ($N=475$, 52%), 2 indicating at most three years of higher education without achieving an academic degree ($N=220$, 24%), and 3 indicating a higher education with an academic degree or a job that implies leadership ($N=216$, 24%).

2.3 Statistical analyses

Pearson correlations were computed between ability and satisfaction with school and work. Since the relations might be mediated by achievement (school performance and work level), a more comprehensive test of the relations between ability, satisfaction, and achievement was conducted using latent variable structural equation modeling. The average score of verbal, inductive and spatial ability at ages 10 and 13 served as the indicator of ability. The two school achievement scores, obtained at ages 13 and 16,

were used as indicators of school achievement at the two respective ages. The SSYK code was used as the single indicator of middle-age work achievement. For the remaining latent variables, the number of manifest indicators had to be reduced. Following the procedures recommended by Brooke, Russell and Price (1988), the items measuring school satisfaction (at ages 13 and 16), and extrinsic and intrinsic job satisfaction in middle age, were collapsed into three indicators per construct, which is in line with the development of parallel test forms (Nunnally, 1978). Based on a one-factor solution of all items used to measure a certain construct, the indicators were formed by assigning the items with the highest and the lowest factor loading to the first indicator, the items with the second-highest and second-lowest factor loading to the second indicator, and the items with the third-highest loading and third-lowest loading to the third indicator. The procedure continued until all items defining the scale in question were assigned to one of the three indicators. For each of the three indicators, the mean of the assigned items was computed and used in the subsequent analyses.

The variance/covariance matrix of these indicators served as the input for the maximum likelihood estimation procedures of LISREL 8 (Jöreskog & Sörbom, 1996). Four models were tested simultaneously for males and females. Following Anderson and Gerbing's two-step approach (1988), we first conducted a confirmatory factor analysis based on the indicators of the eight latent variables (Model 1), in order to evaluate the degree of misspecification in the measurement models. In the second step, the correlations between all eight factors were replaced by the hypothesized structural relations between the factors, thus allowing for the evaluation of change in model fit between the factor model and the more restricted structural model. In the hypothesized

model, achievement at each age was specified to mediate the effects of ability on satisfaction (at the corresponding age); and the developmental effects of achievement on subsequent achievement, as well as of satisfaction on subsequent satisfaction, were also specified (see Figure 1). The multi-group procedure of LISREL 8.7 was used to test three versions of the hypothesized model in order to investigate whether the direct and indirect effects of ability were similar for women and men. In Model 2, all parameters were freely estimated for women as well as for men. In Model 3, we tested for measurement model equivalence across the sexes by imposing equality constraints on the factor loadings and measurement errors. Finally, all parameters in both the measurement model and the structural model were constrained to be equal over groups (Model 4).

The assessment of overall model fit to data was based on two indices. In addition to the chi-square statistic – which is sensitive to sample size and therefore must be interpreted with caution (e.g., Bentler & Bonett, 1980) – we also evaluated overall model fit using the root-mean square error of approximation (RMSEA). RMSEA values below .08 indicate a reasonable error of approximation (Browne & Cudeck, 1993). For descriptive purposes, we have also reported the standardized root-mean-square residual (SRMR; Jöreskog & Sörbom, 1996), the goodness-of-fit index (GFI; Jöreskog & Sörbom, 1996), and the normed fit index (NFI; Bentler & Bonett, 1980). GFI and NFI values above .90 indicate good fit (Bentler & Bonett, 1980), whereas low values of the SRMR signify small residuals. In addition to the chi-square difference test, comparisons between the nested models were conducted using the Akaike measure (AIC; Akaike, 1987), for

which lower values indicate a better model, and the parsimony normed fit index (PNFI; James, Mulaik & Brett, 1982), for which higher values indicate better fit.

3. Results

3.1 *The relationship between ability and school/job satisfaction.*

Table 2 presents the correlations between the ability measures and school/job satisfaction. There were some significant positive correlations at age 13 for all ability variables of both sexes. At age 16, however, no such relationships emerged. Some weak negative associations were found between job satisfaction and ability at age 26. With women at age 43, there were significant but weak positive correlations between intrinsic job satisfaction and all ability variables. For their male counterparts at age 48, no such significant relationships were found, but correlations did emerge between extrinsic job satisfaction and ability. It should be noted that all of the significant correlations reported in Table 2 were low, with explained variances in the range of 1-8 %. The magnitude of the correlations were fairly similar for the different abilities, although the relationships were sometimes lower for spatial ability. In the following, therefore, only general ability is studied.

Table 2 in about here

3.2 *Test of overall model using structural equation modeling*

Table 3 presents the fit indices of the multi-group structural equation modeling tests. The confirmatory factor analysis (Model 1), which specified eight correlated factors (ability, school achievement at age 13, school satisfaction at age 13, school achievement at age 16, school satisfaction at age 16, work achievement at age 43/48, extrinsic job

satisfaction at age 43/48, intrinsic job satisfaction at age 43/48) provided a reasonable fit to data. Although the chi-square statistic was significant, indicating that the model did not fit the data perfectly, the RMSEA suggested reasonable errors of approximation. All factor loadings were significant with standardized estimates typically larger than .65 (the only exception concerned the second indicator of school satisfaction at age 16, which equaled .57 for women and .47 for men). Moreover, the loadings were fairly similar across the sexes.

Table 3 in about here

Model 2, which tested the proposed structural model (without imposing equality constraints across the sexes), still provided an acceptable fit to data. Although the chi-square difference from Model 1 was significant and the AIC increased, the PNFI also increased and the RMSEA remained largely the same. This finding indicates that the replacement of the correlations between the eight latent variables with the constraints imposed by the structural model only marginally impaired the fit of the model to the data. Also, the parameter estimates in the structural model were relatively similar across the sexes. For Model 3, in which the parameters in the measurement model (i.e., factor loadings and measurement errors) were constrained to be identical for women and men, the chi-square increased significantly, but the other fit indices were stable or improved. This suggests that it may be possible to measure ability, achievement, and satisfaction in a similar way for males and females. When the parameters in the structural model were also constrained to be equal across the sexes (Model 4), there was a slight increase in the chi-square, although the remaining fit indices indicated that this model still provided

The absence of a relationship between intelligence and school satisfaction at age 16 is puzzling, however, and therefore deserves some commentary. It might be, for instance, that the lack of a significant association can be explained by a restriction of range in intelligence, since only adolescents in the stream leading to senior high school were studied (53 percent of the sample). It is also possible that it may be a function of a lack of validity in the school satisfaction measure. Perhaps the pupils were more interested in other things than school at the time, such as finding an identity (Erikson, 1993). As expected, at middle age the relationship between ability and job satisfaction was significant, although the relations were only significant in respect to extrinsic job satisfaction for males and only in respect to intrinsic job satisfaction for females. However, when we tested for sex differences in the correlations between ability and satisfaction, they were not significant. The low correlations we found at school age are in line with other research findings (Ablard, 1997; Chapman & McAlpin, 1988; Diedrich & Jackson, 1969), but the low correlations found at middle age may well be a consequence of specifically Swedish conditions, which are characterized by a comparatively weak relationship between job level and salary.

Developmental aspects of the relationship between ability and satisfaction were examined by structural equation modeling. However, although we were able to identify a model that fitted the data acceptably well, it must be recognized that there might be other models that also fit the data and, moreover, that with this type of modeling one also has to assume that a linear model is adequate. With the use of our structural equation model, earlier findings were confirmed, namely that satisfaction with school or

work was found to relate to school achievement and work achievement (Dunér, 1972; Ganzach & Pazy, 2001; Handschin, 1996; Loundsbury et al, 2004). It was further indicated that the relationship of intelligence at school age with school or job satisfaction was largely mediated by school achievement or work achievement, which is in line with our expectations.

In the correlational analyses, we found stronger relations between ability and job satisfaction in middle age than in young adulthood, and in the structural equation model, we saw that this relationship to intrinsic job satisfaction in middle age was largely mediated by work achievement. We might expect that job congruence (that the individual has a job suited to his/her intelligence) would be rather good in middle age, at least for males. This expectation is supported by findings by Jespen and Sheu (2003). Given their findings, it might be argued that an individual's career pattern tends to evolve towards greater congruence with age. Indeed, research has found that age may have a U-shaped relationship to job satisfaction, with the lowest job satisfaction occurring at about age 30 (Clark, Oswald & Warr, 1996; Ganzach, 1998). With respect to the relationship between intelligence and school/job satisfaction, we found a study exhibiting an age-related trend paralleling the one reported here. Ganzach and associates (Ganzach, 1998; Ganzach & Pazy, 2001) found that for young adults, both intelligence and education had an impact on job complexity, which, in turn, positively influenced job satisfaction.

As previously mentioned, the correlational analyses showed that there were some, albeit small, sex-related differences. However, when we applied structural equation modeling,

we could not reject the hypothesis that the same model applied to both sexes. This finding is especially important given the scarcity of research that has examined sex-related differences in regard to the mechanisms leading to job satisfaction. We suggest that similar mechanisms are operating for both sexes. This finding is in line with those of Anderson et al (1997) who, using Holland's (1966) RIASEC model, found no sex-related differences in the mechanism behind job satisfaction. Smart et al (1986) claimed that congruence level is an essential aspect of job satisfaction, and added that, for women in particular, it plays an especially important role in respect to intrinsic job satisfaction. Furthermore, Elton and Smart (1988) noted that men tend to be more sensitive than women to extrinsic rewards with regard to their effect on extrinsic job satisfaction. These findings are at odds with the fact that we did not encounter any sex-related differences in the multi-group structural equation model we have reported. Inequalities in salaries are rather small in Sweden as compared to most Western countries (Eurostat, 2002; ILO, 2001; Statistics Sweden, 2002), which might explain the weak, non-significant relation found between work achievement and extrinsic job satisfaction in our structural equation model. The generous Swedish parental-leave and day-care systems might also contribute to the diminished differences between the sexes (Albrecht et al, 1999; Gonäs, 1999).

Holland (1959, 1966) stipulated that it is important with individual-organizational fit for job satisfaction, but he de-emphasized the importance of ability. The present study is partly in accordance with Holland's theories. Feij (1998, 2002) argued for the importance of having personal values that match organizational values when it comes to perceived job satisfaction, innovative behavior, and having a low turnover rate. Since

values, other-focused interest, in adolescence tend to contribute to future relations and work life (Price, 2002; Stattin & Kerr, 2001), it might be that the importance of one's ability for job satisfaction is overshadowed by other factors of the type discussed above.

A number of limitations apply to this study. First, ability was measured through indicators of verbal, inductive and spatial intelligences at the ages of 10 and 13 and then averaged across age. Since similar results were obtained for the different ability components and therefore only the results for global intelligence are reported. However, considering that intelligence measured in late childhood has been found to be highly correlated to adult intelligence (see Bloom, 1964; Deary, Whalley, Lemmon, Crawford & Starr, 2000; Hopkins & Bracht, 1975; Tyler, 1958), it is justifiable to regard the present study's measure of intelligence as a good indicator of adult intelligence.

Another potential limitation concerns the fact that the sample at age 16 was confined to those who were in the senior high school preparatory stream, which might have implications for the results since the accompanying restriction of range in the intelligence variable could have lowered its correlations with other variables. Concerning the validity of the measures of school satisfaction at age 13 and 16, there has not yet been a systematic study of this question, although these measures have been used in many studies within the longitudinal program and have usually showed the expected relationships to other variables (e.g. Dunér, 1972).

As was pointed out previously, a number of social conditions in Sweden are different from those in most other countries, and this might have led to the magnitude of the

relationships between intelligence and job satisfaction that we found, as well as to that the sex-related differences being somewhat smaller than might have been the case if the study had been carried out in, for instance, the USA.

In future studies, it would be of interest to examine in more detail the possible non-linear relationship between ability and job satisfaction – especially in relation to the role of ability in combination with the level of work/work complexity. For example, Conger and Kanungo (1988) discussed the importance of empowerment (to enlarge the tasks) for positive attitudes towards work. In the present study, it seems appropriate to suggest that high work achievement could be of importance for perceived intrinsic job satisfaction. Perhaps this is partly a reflection of empowerment, a feeling of competence, or just knowing that one is useful (which is one aspect of intrinsic job satisfaction).

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Table 1. *Demographics for the IDA sample and Sweden in general.*

	IDA sample		Sweden in general	
	Women age	Men age	Women age	Men age
	43	48	35-44	45-54
Married/cohabitants	82%	76%	81%	72%
Own children in household ¹	80%	63%	78%	44%
Average wage SEK/month	15 502	28 134	16 742	24 762
Education				
Compulsory school ²	21%	10%	18%	24%
Some schooling ³	46%	60%	68%	59%
University degree/ higher education ≥3yrs ⁴	33%	30%	13%	16%

Note: The figures are from 1998 for women, and 2003 for men. Data for Sweden in general is from SCB (1998, 1999a, 1999b, 1999c, 2003, 2004a, 2004b, 2004c).

¹Children under 16 for Sweden in general.² In Sweden in general for women, compulsory school includes education at the folk high school; for men it includes education before senior high school level.³ In Sweden in general, some schooling for women includes education at the senior high school level through education after senior high school level up to 3 years. For men, some schooling includes education at senior high school level and up to 2 years education after senior high school level.⁴Higher education ≥3yrs after senior high school for Sweden in general.

Table 2. *Correlations between intellectual ability and satisfaction with school and work.*

	Intellectual ability			
	Verbal	Inductive	Spatial	General
Females				
School satisfaction, age 13	.20**	.17**	.13**	.20**
School satisfaction, age 16	-.03	-.03	-.01	-.03
Job satisfaction, age 26	-.04	-.10*	-.11*	-.10
Extrinsic job satisfaction, age 43	-.01	.03	.04	.01
Intrinsic job satisfaction, age 43	.13**	.12*	.14**	.15**
Males				
School satisfaction, age 13	.18**	.20**	.11*	.19**
School satisfaction, age 16	-.01	-.02	-.04	-.03
Job satisfaction, age 26	-.11*	-.09	-.02	-.09
Extrinsic job satisfaction, age 48	.14*	.13*	.06	.13*
Intrinsic job satisfaction, age 48	.08	.08	.09	.10

Note: The sample size varies between 289 and 545

* $p < .05$, ** $p < .01$

Table 3. Results of multi-group structural equation modeling

Model	df	χ^2	RMSEA	SRMR	GFI	NFI	Model comparisons					
							Models	Δ df	$\Delta\chi^2$	AIC	PNFI	
<i>Confirmatory factor analysis (CFA)</i>												
1	CFA 8 correlated factors	284	1115.81	.081	.05	.88	.92	--	--	--	1387.81	.69
<i>Test of hypothesized model</i>												
2	Freely estimated measurement model parameters	314	1220.64	0.080	0.06	.88	0.92	2 vs. 1	30	104.83*	1432.64	.76
<i>Tests for equality of model parameters for females and males</i>												
3	Invariant measurement model parameters	347	1270.17	0.077	0.06	.88	0.91	3 vs. 2	33	49.53*	1416.17	.83
4	Invariant measurement and structural model parameters	367	1327.38	0.076	0.08	.87	0.91	4 vs. 3	20	57.21*	1433.38	.88

Note: * p<.05

Table 4. *Decomposition of effects: all parameters constrained to be equal across sexes (standardized estimates).*

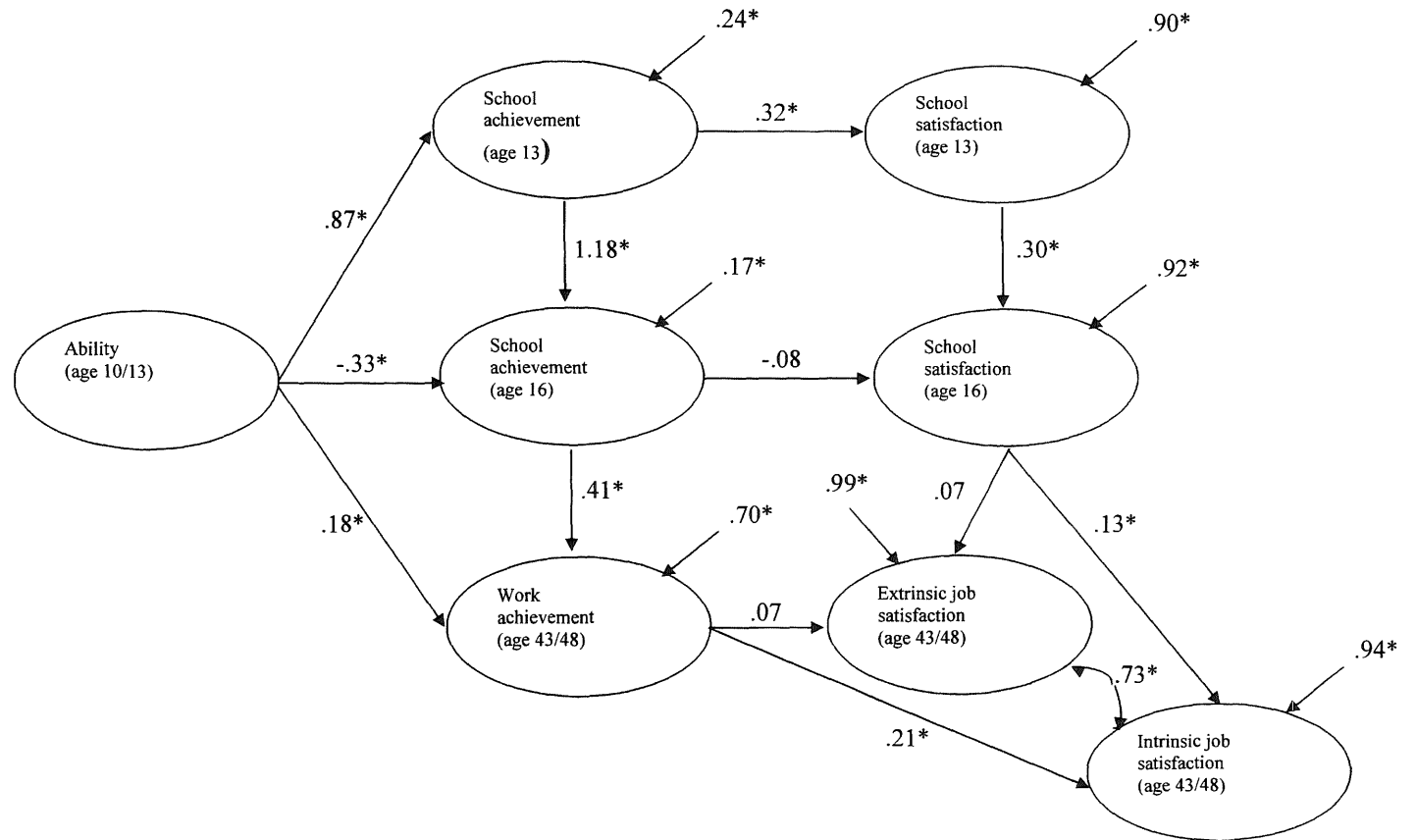
Predictor	School achievement (age 13)		School satisfaction (age 13)		School achievement (age 16)		School satisfaction (age 16)		Work achievement (age 43/48)		Extrinsic job satisfaction (age 43/48)		Intrinsic job satisfaction (age 43/48)	
	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
	Ability (age 10/13)	.87*	-	-	.28*	-.33*	1.03*	-	.02	.18*	.29*	-	.04	-
School ach. (13)	-	-	.32*	-	1.18*	-	-	.00	-	.49*	-	.03	-	.10*
School satis. (13)	-	-	-	-	-	-	.30*	-	-	-	-	.02	-	.04*
School ach. (16)	-	-	-	-	-	-	-.08	-	.41*	-	-	.02	-	.07*
School satis. (16)	-	-	-	-	-	-	-	-	-	-	.07	-	.13*	-
Work ach. (43/48)	-	-	-	-	-	-	-	-	-	-	.07	-	.21*	-
Extrinsic j.s. (43/48)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Intrinsic j.s. (43/48)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R ²	.76		.10		.83		.08		.30		.01		.06	

Note: Correlation between extrinsic and intrinsic job satisfaction = .73.

* p<.05

Figure 1. Hypothesized model with all parameters constrained to be equal over the sexes (measurement models omitted; standardized estimates;

* $p < .05$).



Study 2
Manuscript

Ability and job satisfaction across occupational area and occupational level

Abstract

The impact of childhood ability for adult job satisfaction was studied. Differences in both ability and job satisfaction in different occupational levels and occupational areas were examined as well as the relationship between ability and job satisfaction in different occupational levels and occupational areas. The present study used a longitudinal sample of about 1000 women and men followed from age 10 to age 48. As expected ability was found to have impact on the vocational choice and to be rather stable from childhood into adulthood. The results show that ability and job satisfaction varied among different areas and occupational levels. Overachievers were more satisfied with their jobs than normal or underachievers. The study could not confirm a non-linear relationship between ability and job satisfaction across occupational areas or occupational levels.

Key word: ability, job satisfaction, occupational area, occupational level

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Introduction

The present study deals with the relation between ability and job satisfaction in different occupational areas and occupational levels. The impact of childhood ability for adult job satisfaction was examined and data were used from a Swedish longitudinal sample of 1392 men and women.

Previous research has shown the importance of a high job complexity for perceived job satisfaction (see e.g. Ganzach, 1998; Ganzach & Pazy, 2001). Wulff, Bergman and Sverke (submitted) found few significant correlations between ability and job satisfaction and there were no significant sex differences in job satisfaction. Few studies on ability and job satisfaction have included both occupational area and occupational level in the research design and there is a need to study differences in

Job complexity/ occupational level

There are different aspects concerning job performance and job complexity, of which some are discussed below. One aspect is the qualifications required and needed to perform the job. Aronsson (1997) described the difference between qualification as an objective demand at the work site and the actual qualification of the individual. In today's society, there are structural changes in qualifications needed from the work force. For example, technological change creates new demands on the work force from the employer. Another but earlier aspect is given by Bravenman (1977) who discussed work classification according to a dimension developed from the demands in the handicraft sector where the worker has to do the task using both hand and brain power. If a work in other areas has those properties it is classified as a pretty good job. However, the worker in the industry- and in the office work sector has been reduced to a production factor "a machine part". This was the approach in Taylor's ideas - putting into practice hard driven specialization.

The ideal condition of planning and execution of a task was also used in theories behind VERA (Verfahren zur Ermittlung von Regulationsfordernissen in der Arbeitstätigkeit; Aronsson & Friedrich, 1988). In this VERA model, the demands to carry out such work tasks were measured as well as various learning aspects. Those demands were reported by an expert and were not the workers own perceived competence. There might be advantages or disadvantages in describing a job or the level/complexity of the job. For women it was in some cases good to classify after educational level (Arber, 1997). Educational level is a good classifier for both sexes, if socioeconomic factors are also considered (Mackenbach & Kunst, 1999).

In the present study the educational level needed to perform the job well is used. The levels are in five steps and the lowest category is work that demands no education and the highest level is university degree (and sometimes top management). This scale is an elaborated form of SSK (Swedish version of ISCO-88 (COM), International Standard Classification of Occupations 1988, EU version). The original form was taken from the ILO, (International Labour Organisation).

However, high occupational level might be problematic. Job enrichment or high job complexity is not always positive, neither for the employee nor the employer. Oldham, Hackman and Pearce (1976) hypothesized that if a worker has a huge need for growth, need for strength, and is satisfied with the work context (as e.g. salary) it was motivating with enriched work. They concluded that an employee would be eager to perform at a higher level and would be more motivated, when he/she is satisfied with work conditions and has high "growth-need strength". It was shown that the opposite was true as well. If a worker does not have control over the work process, he will feel helpless, and this learned helplessness is accounted for by measures of negative mood and self-handicapping (Aronsson, 1997). To conclude, as long as the employee perceives he has competence, has control, and desire to grow, it is positive with a higher job complexity. So, in this study an underlying rationale is that occupational level has implications for job satisfaction.

There might be different priorities among women and men concerning the importance of job complexity. Girls thought it was more important to choose the appropriate occupational area (Horizontal dimension) than boys. Boys, on the other hand, gave priority to achieving a high occupational level - (Vertical dimension) (see for example Magnusson, Dunér & Zetterblom, 1975). Job complexity seems to be

important for job satisfaction according to other studies as well (e.g. Hyllegard & Lavin, 1992, Ganzach, 1998, Ganzach & Pazy, 2001). For staff engineers the context was more important for the relationship between work complexity-job performance than was the case for Research and Development (R&D) engineers. Gaining tenured status at a position mediated the relationship and was found to be positive for R& D engineers (Kozlowski & Hult, 1986). It seems as job complexity is a contributing factor, but not the only factor, for positive job attitudes. However, in the present study it is argued a high job complexity/occupational level is positive for both sexes for high job satisfaction, as was also shown in an earlier study (Wulff, Bergman & Sverke, submitted).

Occupational area and different ways to divide the job market into diverse sectors

There is a variety of ways to divide work sites and environments into different sectors. One way is to compare the public vs. the private sector as in, for example, the study by Mulinge (2000) who compared private, public and semi-public sectors. Another way is to look statistically at typical female or male organizations, specifically those where females typically work (like education and healthcare) and where men typically work (like science and technology) as in studies like (Lindroth, 1999; Cooper & School, 1989). Gender typical or atypical works is also studied by Govier and Feldman (1999) who showed that males and females in male dominated occupations performed better on spatial tests than males and females in more female occupations. The opposite was true for verbal tests, probably because these very different professions have diverse demands. Another example was Greenfeld, Greiner and Wood (1980), who concluded that there were differences among women in typically male-dominated jobs, female-dominated jobs and gender-neutral jobs. It seemed that women in male-dominated jobs had higher education and were older than women in other groups. The women in male jobs had other indicators of success, (such as higher salary) than the other two groups of women (Greenfeld, Greiner & Wood, 1980). There exists many ways to in different manners examine the structure of the labour market. The purpose of this paper is to study a representative selection of occupations, including the major sectors of the labour market. In this study, the classification system used in the IDA project was adapted whereby work professions were divided into seven sectors. Science - Technology, Industrial-Handicraft, Administrative work, Service, Human service, Education and "Other" (including farmers, work in the cultural field and other "independent" jobs) (see Andersson, Magnusson & Dunér, 1983; Lindroth, 1999). In this classification system, the sectors in the major part of the labour market are represented.¹

Occupational level and occupational area and their relation to job satisfaction and ability.

Research on job satisfaction has focused on many different aspects, for example, person-environment fit, job performance, education and ability.

Person-environment fit. On example of studying person-environment fit was Caldwell and O'Reilly (1990)'s attempt, to measure person-job fit measured by demands and qualifications needed for the job as well as personal characteristics. They showed, in various work-settings, the importance of relating person-job characteristics

¹ In the earlier IDA studies the SSYKcode was not used.

in profiles, as well as the relevance with person-job fit for job performance and intrinsic job satisfaction. Caldwall and O'Reilly (1990) suggested that a good fit between personality and job characteristic will enhance intrinsic job satisfaction, and a bad fit will promote stress. The importance of person-environment fit was discussed in other studies as well (e.g. Holland, 1959, 1966). Congruence between the person and his environment seems essential to perceive job satisfaction. This is also an underlying reasoning in this study, and it is also argued that there are small differences between the sexes in this regard.

Gender approach. A gender approach to factors important for job satisfaction was presented by Moore (1985). She found gender differences in the priorities of factors that had a positive impact on job satisfaction. If people choosed to work in a female or male-dominated area they had different values (Moore, 1985). It might be argued, that they had it from the origin. She found that, women who worked in a female dominated area valued intrinsic rewards (including skills), socio-emotional values, and the possibility to combine work with home and children. Women in male dominated jobs had high job satisfaction and valued status, skill, age, and salary. Men in male dominated jobs had similar priorities as women in female-dominated areas, yet men in female-dominated areas had lower job satisfaction than other groups and for them, in particular, included somewhat differing support factors (Moore, 1985). So, it seems as there are differences in job satisfaction between occupations, but not per se between the sexes. So, minor differences in what is important for job satisfaction might be expected.

Job performance. Another factor which is important for job satisfaction is job performance. In their meta-analyses Petty, McGee and Cavenders (1984) found a correlation (corrected for attenuation) of .31 between overall job satisfaction and performance. Among those who worked on a level that demanded more skills, the relationship was (corrected for attenuation) .41, but for those working at a lower level it was just .20. However, dissatisfaction with salary may lead to worse performance as well as lower job satisfaction. In this regard, it was suggested that there might be a circular relationship (Petty, McGee & Cavender, 1984) between job performance and job satisfaction. Another study, a meta analysis, by Judge, Thoresen, Bono and Patton (2001) concluded that overall job satisfaction and job performance correlated .30. They suggested a bidirectional relationship with moderating and modifying variables, and that the relationship might be moderated by complexity, or personality factors like self-esteem. There is obviously a relation between job performance and positive work attitudes. It is also one of the rationales behind the reasoning in this study.

Education. A high occupational level/job complexity is often connected to a high level of education and job satisfaction. Education might give a chance for a more qualified job, which in turn probably gives better chances to perceive job satisfaction. Hyllegard and Lavin (1992) argued that education, and especially a postgraduate exam, increased chances for a challenging, demanding job that gives intrinsic satisfaction. Furthermore, they stated that gender differences in the labour market might depend on sex-stereotyped majors at university (Hyllegard & Lavin, 1992). Further, Ganzach (2003) studied the importance of education to perceive job satisfaction, using subjects from a sample of men and women born between 1942 and 1964 (and aged from 24 to 38 years old) in his data analysis. Job complexity was measured through DOT (Dictionary of Occupational Titles, from Roos & Treiman, see Ganzach, 2003). Salary information was also used. The measured facet job satisfaction has similarities to intrinsic job

satisfaction. He found a negative relationship between intelligence and intrinsic job satisfaction, and a negative relationship between education and wage satisfaction. There was no significant relation between education and intrinsic job satisfaction. Mediated by job complexity, there was an indirect positive relation between intelligence and intrinsic job satisfaction. He found similar results for another sample however in this sample there was a negative relationship between job complexity and wage satisfaction. It seems that job complexity/occupational level was found to be important for job satisfaction. Education per se might be important for job satisfaction because it might operate via job complexity. Again, occupational level/job complexity is important for job satisfaction.

Ability. Finally, it is argued that ability is related to job satisfaction, but there might be a mediating role of job complexity. Ganzach (1998) examined the relationship between intelligence, job satisfaction, task complexity, and education. He found a negative relationship between job satisfaction and intelligence. Ganzach and Pazy (2001) also found a negative relationship between intelligence and job satisfaction, and that intelligence and vocational complexity were positively related. Thus, ability is indirectly related to job satisfaction, via job complexity/occupational level. In the study at hand, a rationale is that, ability is related to job satisfaction. Further that job satisfaction per se, would be higher if the occupational level is higher and that a high occupational level in turn is associated with high ability.

Expectancy theory.

As mentioned, expectancy theory might explain some factors important for job performance and job satisfaction. In Hackman and Porter (1968)'s study of work effectiveness among telephone service employees it was stated that "Expectancy theory states that the strength of the tendency for an individual to perform a particular act is a function of (a) the strength with which he expects certain outcomes to be obtained from the act, times (b) the attractiveness to him of the expected outcomes" (Hackman & Porter, 1968, p 418). Outcomes could be different things, in the quoted study work effectiveness, or it might be pay or positive work attitudes. The authors found significant correlations between predictions and performance criteria (such as effort and job involvement). There were no connections with work quality. If a person regards it is worth to achieve well, he probably will work harder. This in turn might contribute to positive work attitudes (i.e. job satisfaction).

Lawler and Suttle (1973), examined a model in a setting of retail sales managers. Effort increases expectancies concerning outcome (this is called expectancy 1, extrinsic rewards like salary and career possibilities). Further, performance rise expectancies about outcomes (this is called expectancy 2; if one will perform well one has to put in great effort and should for example have more pay). The value of the expectancies for the individual in the two steps, were also taken into consideration. Motivation was the product of the previous steps. The expectancies were good predictors of the performance. "The results of the factor analysis show that the subjects distinguish between expectancies involving intrinsically and extrinsically rewarding outcomes. Interestingly the intrinsic reward expectancies correlated most highly with performance" (Lawler & Suttle, 1973, p 500). The authors found weak correlations between ability and performance but expectancies, role perceptions and ability did correlate with performance. The study "like others which have tested expectancy theory did not

measure the attractiveness of various levels of performance” (Lawler & Suttle, 1973, p 501). There is a need to study the outcome with respect to different levels of performance. In the following, it is argued that intrinsic rewards have similarities to the measure intrinsic job satisfaction, and extrinsic rewards have similarities with extrinsic job satisfaction. In Figure 1, the rationale in the present study is presented. Ability is believed to influence occupational level, occupational area and job satisfaction. Occupational level and area are also believed to influence job satisfaction and not the all influence of ability on job satisfaction is believed to go via occupational level and area.

Purpose

Many factors contribute to job satisfaction. One such factor is general ability (the sum of verbal, inductive and spatial ability) which is investigated in this study. The aim of this study is to investigate how ability at a young age relates to adult job satisfaction when different occupational levels and occupational areas are taken into consideration. The following predictions are made.

1. Higher ability will promote and increase job satisfaction more than lower ability. The impact of ability on job satisfaction is partially mediated by occupational level.
2. The impact of ability may vary according to occupational area even when occupational level is taken into consideration. People in occupational areas which demand higher education will perceive higher job satisfaction.
3. There might be an optimal level of ability for each specific occupational level. Below this level, satisfaction may increase as a result of increasing ability. Above this level, satisfaction levels might decrease due to boredom, a feeling of wasting one’s talent etc. Ability per se moderates perceived job satisfaction even if occupational level is taken into account.

Together, these predictions paint a fairly complex picture of what relationships could be expected between ability and job satisfaction. They may even be non-linear and vary according to the type of occupational level/occupational area studied. Overall, the purpose of this article will be to study these relationships between childhood ability and job satisfaction in midlife with respect to occupational level and occupational areas, and examine differences in ability and job satisfaction between occupational levels and occupational areas.

Method

Sample

This study uses data from the longitudinal research program: Individual Development and Adaption (IDA; Bergman, 2000; Magnusson, 1988). The project began in the middle of the 1960’s, and is based on an entire school grade cohort of children from the Swedish city of Örebro. Data on both genders was used from the ages 10 and 13, and the age of 43 for women and 48 for men. The sample consisted of about 468 women and 296 men. The IDA sample can be considered a reasonable representative sample of other urban Swedish cities (Bergman, 1973). Through the years, the dropout rate has

been very low, 5-15% at a given age (Bergman, 2000; Magnusson, 1988).² For the women about 88 % participated at age 43 (Näswall, Sverke, Isaksson, Johansson & Lindroth, 2002). For men at age 48, 82 % of the total sample participated (Trost & Bergman, 2004).

Table 1 presents basic demographic information for the IDA sample and for Sweden in general. It is seen that, broadly speaking, the demographics of the IDA sample are fairly similar to what applies to Sweden in general with a tendency that having a higher education is more common for the IDA sample than for Sweden in general.

Table 1. *Demographics for the IDA sample and Sweden in general.*

	IDA sample		Sweden in general	
	Women age 43	Men age 48	Women age 35-44	Men age 45-54
Married/cohabitants	82%	76%	81%	72%
Own children in household ¹	80%	63%	78%	44%
Average wage SEK/month	15 502	28 134	16 742	24 762
Education				
Compulsory school ²	21%	10%	18%	24%
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University degree/ higher education ≥3yrs ⁴	33%	30%	13%	16%

Note. The figures are from 1998 for women, and 2003 for men. Data for Sweden in general is from SCB (1998, 1999a, 1999b, 1999c, 2003, 2004a, 2004b, 2004c). ¹Children under 16 for Sweden in general. ² In Sweden in general for women, compulsory school include education at people's high school, for men it includes education before senior high school level. ³ In Sweden in general, some schooling for women include education at senior high school level to education after senior high school level up to 3 years. For men some schooling is education at senior high school level up to 2 years education after senior high school level. ⁴Higher education ≥3yrs after senior high school for Sweden in general.

Measures

Ability. Ability was measured with the Swedish DBA test (Härnqvist, 1962). It was given when the pupils were 10 and 13 years of age. Four different ability scores were

² *Acknowledgements.* This study was made possible by access to data from the longitudinal research program Individual Development and Adaptation (IDA). The scientific leader is Lars R. Bergman. David Magnusson was responsible for the planning, implementation and financing of the collection of data up to age 26. The data collection was supported by grants from the Swedish National Board of Education, the Swedish Committee for the Planning and Coordination of Research, The Bank of Sweden Tercentenary Foundation, the Swedish Social Research Council, and the Örebro County Council.

used, verbal, inductive, spatial and general intelligence. According to Hårnqvist (op.cit.), the reliabilities are about .90 for verbal, inductive and spatial ability, and .95 for general ability. The ability measures were z-standardized and age 10 and age 13 scores were averaged. The final score was then *T*-standardized again. If the ability measure was missing at one age, the other one was used.

Job Satisfaction. Both *Intrinsic Job Satisfaction* (12 items, $\alpha = .86.$) and *Extrinsic Job Satisfaction* (6 items, $\alpha = .82$), were measured using the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England & Lofquist, 1967). For both variables, the means of the appropriate items constituted the scale. The raw scores were then *T*-standardized ($M=50$ and $SD=10$). If the answer to at most one item was missing an imputation procedure was carried out. The scale was then formed by the mean of the answers to the valid items.

Occupational Level 43/48. Swedish Standard Classification of Occupations (SSYK) is the Swedish version of ISCO-88 (COM) (International Standard Classification of Occupations 1988, the version for the EU). The original form is taken from the ILO, (International Labour Organisation). SSYK is an international code for classification of different vocations and jobs that has been adjusted to Swedish circumstances. It consists of a four-digit-code, where the first digit shows job sector and the necessary education to perform the job well; the second digit shows the sector or a further specification, and the third and fourth gives even further specifications (SCB, 1998). In this study, SSYK was partly used, partly elaborated on, to show the occupational level at age 43/48, where “1” means almost no education, “2” is education at senior high school level, “3” is at most three years of higher education without achieving an academic degree, “4” is a higher education with an academic degree, and “5” is women and men with a job that implies leadership on a high level. When using a three categories occupational level, as in most analyses, 52.1% worked on level “2”, 24.1% on level “3” and 23.7% on level “4” in the sample.

Occupational area. The classification system was an elaborated version of Lindroth’s (1999) classification in which SSYK was categorized into the IDA project’s classification system. There are seven different areas where “1” indicates Technical - Scientific work (6.5%), “2” indicates Industry – Handicraft (12.8%), “3” indicates Administrative work (29.4 %), “4” is “Others” (2.5%), that do not fit in other groups (like farmers), “5” indicates Service area (15.1%), “6” indicates Human service (18.6%), and finally “7” was used for Education (15.0%).³

Statistical

Correlations. Pearson’s correlations were computed between ability and job satisfaction with respect to different occupational levels and occupational areas. Partial correlations were also computed, controlling the relationship between ability and job satisfaction in different occupational areas for occupational level.

³ In the earlier IDA studies the SSYKcode was not used.

ANOVA. Analyses of variance were performed to compare means in job satisfaction and ability between different occupational levels and occupational areas. To test mean differences, post hoc tests using the Scheffe method were carried out.

ANCOVA. Analyses of variance with a covariate were carried out to study job satisfaction in different occupational areas controlling for occupational level.

Non-linearity. Tests of non-linearity were carried out, in which a non-linear term was added to a regression analysis as indicated by the following generic example:

$$\text{Estimated value of job satisfaction} = \beta_0 + \beta_1 A + \beta_2 (A - \bar{A})^2$$

where A is each subject's ability score and \bar{A} is the mean ability score and the β_1 and β_2 are the partial regression coefficients. A significant non-linear coefficient (β_2) indicates a non-linear quadratic relationship.

Over- and underachievement. The residuals between the predicted occupational level and the real occupational level were calculated. The predicted occupational level was computed using multiple regression analysis in the following way:

$$\hat{Y} = \beta_0 + \beta_1 V + \beta_2 I + \beta_3 S$$

where \hat{Y} is the predicted level of work, V is Verbal ability, I is Inductive ability, S is Spatial ability, the β_1 , β_2 , and β_3 are regression coefficients, and β_0 is the intercept. The residual variable was then calculated as the difference between the real occupational level and the predicted occupational level. The variables were then trichotomized so that those with a difference less than -1 *SD* unit were called underachievers and those with a difference larger than 1 *SD* unit were called overachievers and the remaining persons were called normal achievers.

Results

Occupational level

The overall mean for extrinsic job satisfaction for females is 49.23, for intrinsic job satisfaction 49.74, and for ability 50.43. For males the overall mean for extrinsic job satisfaction is 51.21, for intrinsic job satisfaction 50.40 and for ability 49.57.

In Table 2 the means for job satisfaction and ability in all occupational levels are seen. For both sexes there were overall significant differences in job satisfaction and ability across occupational levels. To summarize: starting with the females, post hoc tests showed significantly higher average extrinsic job satisfaction for top management compared to the other occupational levels. In intrinsic job satisfaction, females in work that required senior high school education had significantly lower means than females in work that required higher education. In ability, females in top management positions had significantly higher mean scores than those in work with no educational demands. For males, the post hoc tests showed that top management had the highest extrinsic job satisfaction. In intrinsic job satisfaction work that required senior high school education had significantly lower mean scores than those working in top management. Those with the lowest ability worked in jobs with no educational demands, and the highest ability had those working in jobs which demanded a university degree.

Table 2. Means in job satisfaction and ability according to occupational level.

	Extrinsic JS	Intrinsic JS	Ability
Females			
1. Work without no educational requirements <i>n</i> =16	51.4	45.8	43.4 ^{3 4 5}
2. Work requiring senior high school <i>n</i> = 241	48.9 ⁵	47.0 ^{3 4 5}	48.0 ^{3 4}
3. Work requiring shorter university educ. <i>n</i> =146	49.0 ⁵	51.1 ²	52.7 ^{1 2}
4. Work requiring a university degree <i>n</i> =101	47.3 ⁵	51.1 ²	55.6 ^{1 2}
5. Management , <i>n</i> =10	60.1 ^{2 3 4}	58.0 ²	56.2 ¹
ANOVA	F=3.63 *	F= 6.81 **	F=16.86 **
	<i>df</i> (4,446)	<i>df</i> (4, 446)	<i>df</i> (4, 442)
Males			
1. Work with no educational requirement <i>n</i> =9	44.8 ⁵	48.6	44.0 ^{4 5}
2. Work requiring senior high school <i>n</i> =152	48.7 ⁵	48.0 ⁵	46.2 ^{3 4 5}
3. Work that requires shorter university educ. <i>n</i> =78	52.2 ⁵	51.7	52.8 ²
4. Work that requires university degrees <i>n</i> =73	52.4	51.3	56.5 ^{1 2}
5. Management <i>n</i> =29	59.0 ^{1 2 3}	57.1 ²	55.8 ^{1 2}
ANOVA	F=8.06 **	F=5.36 **	F=20.38 **
	<i>df</i> (4, 274)	<i>df</i> (4, 278)	<i>df</i> (4, 328)

Note: Small companies are excluded for both sexes. X¹⁻⁵= A mean difference significant from the indicated mean in Scheffe post hoc test. * = $p < .01$, ** = $p < .05$

Table 3 displays the correlations between midlife job satisfaction and child ability at different occupational levels. Overall, the correlations were low and non significant.

Regression analysis was carried out in order to test possible non-linear relationship between ability and job satisfaction for the whole sample and within different occupational levels. No significant non-linear relationships were found.

Table 3. *Correlations between job satisfaction and ability within different occupational levels*

	Extrinsic JS	Intrinsic JS
Females		
Management (5) and work requiring a university degree (4) <i>n</i> =85	.02	.10
Work that requires shorter university educ. (3) <i>n</i> =123	-.10	-.13
Work that requires only senior high school (2) and work without demands on education (1) <i>n</i> =191	.07	.17*
Males		
Management (5) and work that requires a university degree (4) <i>n</i> =81	-.11	-.03
Work that requires shorter university educ. (3) <i>n</i> =58	-.00	.01
Work that demand senior high school (2) and work without demands on education (1) <i>n</i> =142	.05	-.06

Note: The groups with educational level 1 and 2, were collapsed, as well as the groups with educational level 4 and 5 (5, indicate top management).

Management in smaller companies was included in group 2.

**p* < .05. Figures within parentheses indicate educational level.

Occupational area

In Table 4, means in job satisfaction and ability are given for different occupational areas.

Table 4. Means in job satisfaction and ability in different occupational areas

	Extrinsic JS	Intrinsic JS	Ability
Females			
1. Technical-Science <i>n</i> =19	52.4	52.9 ²	54.1
2. Industry-Handicraft <i>n</i> =28	48.8	40.7 ^{1 3 5 7}	44.9 ³
3. Administrative work <i>n</i> =162	52.1 ⁶	51.1 ²	52.8 ²
5. Service <i>n</i> =66	54.2 ^{6 7}	53.4 ²	50.5
6. Human service <i>n</i> =150	46.0 ^{3 5}	48.0	49.5
7. Education-social work <i>n</i> =110	47.5 ⁵	50.7 ²	52.0
4. Others <i>n</i> =11	42.0	42.0	50.3
ANOVA	F=7.80 **	F= 6.93 **	F=3.77 **
	<i>df</i> (6, 460)	<i>df</i> (6, 467)	<i>df</i> (6, 464)
Males			
1. Technical-Science <i>n</i> =42	51.1	49.2	56.4 ^{2 5}
2. Industry -Handicraft <i>n</i> =90	48.4 ³	48.2	46.7 ^{1 3}
3. Administrative work <i>n</i> =104	54.3 ²	52.3	52.9 ^{2 5}
5. Service <i>n</i> =72	50.1	50.0	47.0 ^{1 3}
6. Human service <i>n</i> =19	51.2	52.7	53.1
7. Education-social work <i>n</i> =26	51.3	51.0	53.5
4. Others <i>n</i> =12	52.1	54.8	53.4
ANOVA	F=2.83 *	F=1.66	F=8.28 *
	<i>df</i> (6, 287)	<i>df</i> (6,292)	<i>df</i> (6, 350)

Note : X¹⁻⁵ = A mean difference significant from the indicated mean in Scheffe post hoc test. * = $p < .01$, ** = $p < .05$

Overall, females who worked in the service field had the highest extrinsic job satisfaction and those who worked in the human service area among the lowest. Females working in industry-handicraft had the lowest intrinsic job satisfaction and females in the service sector had the highest intrinsic job satisfaction.

Males who worked in administrative work had higher extrinsic job satisfaction than males who worked in industry-handicraft. For intrinsic job satisfaction there were no significant differences.

Females in industry –handicraft had lower ability than those females working in administrative work who had among the highest ability mean scores. Males had the highest childhood ability level in the technical-science area and the lowest mean in the industry-handicraft field.

Non-linearity of the relationship between ability and job satisfaction was examined through regression analysis within occupational areas. The size of the groups varies for the males from $n=17-83$ and for females from $n=13-126$. Only for males a significant non-linearity coefficient was found for those working in the science–technical area, $\beta = -.402$ $p < .05$ (intrinsic job satisfaction), but this non-linear relationship is not strong.

Occupational area and occupational level

Correlations between job satisfaction and ability for the different occupational areas, both with and without control for occupational level are presented in the text only. Generally, the correlations were weak and non-significant. For females there was a significant relationship between childhood ability and intrinsic job satisfaction in the human service area $.20$ ($p < .05$). This correlation disappeared when occupational level was controlled for.

In Table 5, the results from ANCOVAs are seen. Mean scores in job satisfaction were compared between the different occupational areas after occupational level was controlled for and adjusted means in different occupational areas are given. Significant differences were seen in gender, occupational area and the interaction gender* occupational area, with the exception of gender differences in extrinsic job satisfaction. To summarize: In extrinsic job satisfaction, females in the service sector showed the highest adjusted mean and those in human service the lowest. For males, those working in administrative work showed the highest adjusted mean and those in industry-handicraft the lowest. In intrinsic job satisfaction females in the service sector had the highest adjusted mean and those working in industry- handicraft among the lowest. For males, those working in the field of human service had the highest adjusted mean and those in the technical-science field had the lowest adjusted mean in intrinsic job satisfaction. Those working in the other areas were very small groups, just about 11 females respective males.

Table 5. *Results from analysis of covariance with job satisfaction as dependent variables, and occupational area and gender as grouping variables, and with occupational level as covariate.*

	Extrinsic	Intrinsic
	JS	JS
<i>F values</i>		
Gender	3.31 _(1, 746)	4.18 _(1, 758) *
Occupational Area	4.20 _(6, 746) **	4.46 _(6, 758) **
Gender*Occupational Area	2.47 _(6, 746) *	4.00 _(6, 758) **
Adjusted means		
Females/Males		
Technical-Science	51.9/50.5	51.3/47.6
Industry-Handicraft	49.4/49.0	42.3/49.9
Administrative work	52.1/53.9	51.1/51.2
Service	54.7/50.6	54.9/51.4
Human service	46.1/50.8	48.2/51.8
Education-social work	47.2/50.4	49.6/48.5
Others	41.6/51.7	41.1/53.8

Note: The groups with educational level 1 and 2, were collapsed, as well as the groups with educational level 4 and 5 (5, indicate top management). Management in small companies was included in group 2.

* $p < .05$, ** $p < .01$.

Males who worked in administrative work had higher extrinsic job satisfaction than males who worked in industry-handicraft. For intrinsic job satisfaction there were no significant differences.

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Gender*Occupational Area	2.47 _(6, 746) *	4.00 _(6, 758) **
Adjusted means		
Females/Males		
Technical-Science	51.9/50.5	51.3/47.6
Industry-Handicraft	49.4/49.0	42.3/49.9
Administrative work	52.1/53.9	51.1/51.2
Service	54.7/50.6	54.9/51.4
Human service	46.1/50.8	48.2/51.8
Education-social work	47.2/50.4	49.6/48.5
Others	41.6/51.7	41.1/53.8

Note: The groups with educational level 1 and 2, were collapsed, as well as the groups with educational level 4 and 5 (5, indicate top management). Management in small companies was included in group 2.

* $p < .05$, ** $p < .01$.

Over/under achievement and job satisfaction.

As pointed out in the introduction, it has been argued that in order to be satisfied with a job or an education there should be a good match between the level of it and the ability level. To contribute some information to this issue, we calculated the difference between the observed occupational level and the level predicted from the subject's ability according to the regression equation. Based on this difference, the sample was divided into three groups, overachievers, normal achievers, and underachievers. The job satisfaction for these three groups is reported in Table 6.

The results reported in Table 6 imply that for men, overachievers had significantly higher intrinsic and extrinsic job satisfaction at age 48 than normal and underachievers.

Table 6. *Means in job satisfaction for underachievers, normal achievers and over-achievers.*

	Under- achievers	Normal achievers	Over- achievers
Females			
Extrinsic Job Satisfaction age, 43	49.7	48.8	48.8
Intrinsic Job Satisfaction age 43	47.5	49.0	51.8*
Males			
Extrinsic Job Satisfaction age, 48	48.9	50.1	55.8**
Intrinsic Job Satisfaction age, 48	48.2	49.7	54.4**

Note: The over/underachievers were compared to the normal group using a two-tailed t-test. *n:* female underachievers 58, normal achievers 253-255, overachievers 81-83
n: males underachievers 41-44, normal achievers 174-177, overachievers 56-57
 * $p < .05$, ** $p < .01$.

Discussion

To briefly summarize the findings: There are some differences in ability and job satisfaction between different occupational levels and areas. Correlations between ability and job satisfaction in different occupational levels were mostly non-significant. Results showed a significant correlation for females between childhood ability and intrinsic job satisfaction for work requiring a senior high school education. Women working in technical-science, administrative work, service and education areas had higher intrinsic job satisfaction than those working in industry-handicraft. This study also showed a significant relationship between ability and intrinsic job satisfaction in the human service area. This correlation disappeared when occupational level was controlled for. There were differences between occupational areas in ability. For instance, there was a significantly higher ability among women in the administrative work area, than in the industry-handicraft area. For men job satisfaction and ability were significantly higher for men working in the administrative work area than in other areas. This study showed significant differences in the mean scores between the various occupational level and occupational area categories in job satisfaction and ability. In a

one-way ANOVA analysis, significant differences were seen in these different occupational areas, using occupational level as the grouping factor. Finally, an overall ANCOVA, where occupational level was used as covariate, showed significant differences among different occupational areas in job satisfaction. The present study did not confirm a non-linear relationship between intelligence score and job satisfaction.

Limitations and strengths

As mentioned, the IDA sample is reasonably representative for Swedish urban populations. In the present study, work complexity was measured by occupational level. This level was measured by the educational level needed to perform the job, which might have implications for the results. The study at hand measured occupational level on a five-graded scale with level 5, indicating top management. Top management is management of big companies or organizations in the community. About eight percent of the men and two percent of the women worked at this level. If another measure of occupational level/job complexity had been used, different results might have been obtained.

This study measured just cognitive ability (the sum of verbal, inductive and spatial ability), but in some jobs other abilities are important. One example is that practical ability ought to be important in jobs like handicraft and industry. However, cognitive ability is regarded as a rather good predictor for future adjustment. We also used childhood ability as an indicator of ability in adulthood. However, due to the high stability of intelligence this should not be regarded as an important limitation.

To achieve sufficient group sizes the data were analyzed for three broad occupational levels in some of the analysis. Those with little or no higher education were included in the group with education at senior high school. Top management was included among jobs that required a university degree and management of smaller companies were included in work requiring at least senior high school. In some of the analyses, small groups were included and, this has some implications in interpreting the statistical significance of the findings (low statistical power in some tests).

Ability, performance and job satisfaction

Prediction one stated that: Higher ability will promote and increase job satisfaction more than lower ability. The impact of ability to perceive job satisfaction is mediated by occupational level." In the present study the relation between ability and job satisfaction in different occupational levels was studied. Previous findings suggested that there were weak overall relations between ability and job satisfaction (.13**-.15** for general ability, see e.g. Wulff, Bergman & Sverke, submitted). Our results showed that, on the average, people of higher childhood ability had jobs that required higher education. That higher ability is common in works that demand higher education was also found by, for example, Ganzach (2003) and Huang (2001). Education may be an important factor to make it possible to get a qualified job. If one has education one often performs a task better than without education. Petty, McGee and Cavenender (1984) found that there was a positive relationship between performance and job satisfaction. It was stronger among those with work that required higher education than in other groups. Hyllegard and Lavin (1992) have argued that education is an important indicator in obtaining a more rewarding job. It is often argued that a high education is connected to a high intelligence. Research also showed that intelligence has positive impact on success and

to have been given a more demanding job (see e.g. Brody, 1997; Cesi & Williams, 1997, Schmidt & Hunter, 2004). The positive impact of a strong ability-performance relationship, and to fully use the employees abilities were discussed by (Scheider, 1978). This in turn contributes to higher job satisfaction. There is evidence for intelligence promoting a good performance and a high occupational level. A high occupational level might in turn contribute to a high job satisfaction. It seems as prediction one receives partial support.

Occupational level and area

In the present study, there were no consistent findings that those who worked in jobs requiring a university degree had higher job satisfaction than people with jobs with lower educational demands, but roughly people of higher ability worked in jobs requiring higher education than those with lower ability. In some of the analyses, a tendency was that a higher job satisfaction was observed when more education was needed to perform the job i.e. the more demanding the job was. Concerning ability, there was as expected, a relationship to occupational level since the ability mean scores were higher in higher occupational levels. Job demands, occupational level, and job complexity have been measured in similar ways in several studies (Ganzach, 1998, Ganzach & Pazy, 2001; Powell, 1995). Different psychological and physical demands to carry out the tasks often included cognitive ability. According to previous research, more intelligent or intellectually gifted people often have or seek out higher education (e.g. Brody, 1997; see Herrnstein & Murray in Huang, 2001). It is reasonable to argue that, often people with a higher education and at higher occupational levels have higher ability but not necessarily higher job satisfaction.

Prediction two stated that: "The impact of ability may vary according to job area even after occupational level is taken into consideration". This was partially confirmed. The occupational area administrative work included groups of people who had good educational backgrounds (accountants, librarians, bank clerks, public administrators, and top management) and they were found to be more satisfied. As stated above, top management had the highest recorded occupational level in this study. Men working in the technical- science area had the highest scores on ability and men who worked in the administrative work field were reported as having the highest job satisfaction level. Men in those areas often had high educational levels, and this again support previous findings of the importance of occupational level/job complexity as a mediating factor for the relationship between ability and (intrinsic) job satisfaction (see e.g. Wulff, Bergman & Sverke, submitted, Ganzach, 2003). This is consistent with the fact that a reported higher level of job complexity has been found to be associated with a high level of job satisfaction, as has been shown elsewhere (Petty, McGee & Cavenders, 1984; Hyllegard & Lavin, 1992). In the study at hand, women had lower mean scores in job satisfaction and ability among those working in the work-related areas of human service and industry-handicraft compared to the other occupational areas. In the human service area, there was recorded differentiation in education and this may be reflected in the actual results as that many women were working within the area. Healthcare and education fields were predominantly female areas according to earlier findings (see Lindroth, 1999). The differences for men between occupational areas were above all in ability in the present study. It might be that some occupational areas demanded better-qualified individuals; however, it would not guarantee high job satisfaction. A drift towards more

complex jobs was discussed by Huang (2001) and the complexity of jobs is increasing across all the sectors (see e.g. Aronsson, 1997). More and more people will have to perform more complex jobs, and people without higher education may increasingly become segregated in the work force.

In the present study, job satisfaction did not increase linearly as the occupational level increased (even with respect to occupational area) as mentioned. Job satisfaction differed throughout the seven occupational areas. There were significant differences in gender, occupational area and the interaction gender* occupational area in intrinsic job satisfaction when occupational level was used as covariate. Women had the highest adjusted mean scores in the service sector and men in human service field. Lowest means in intrinsic job satisfaction had women working in the industry-handicraft area and men working in technical-science area. As regards extrinsic job satisfaction there were no significant gender differences but a tendency that women in the service sector had the highest adjusted mean, and among men those in administrative work. The lowest adjusted mean scores were for women those in the human service field and for men those in industry-handicraft field. An explanation to differences between occupational areas is the division into public and private sector. In the present study, some differences in job satisfaction between the occupational areas were seen which might be explained by the fact that education and health care are predominantly public service sectors in Sweden, and some of the differences in job satisfaction might depend on the fact that the service area differs from other occupational areas. Findings from Kenya partly support this, since Mulinge (2000) found higher job satisfaction, commitment and intention to stay in private compared to public and semi-public sectors in a study among agricultural technicians. Partly differences were explained by structural differences in the sectors. There might be differences in the work climate in private and public work settings, which has implications for job satisfaction. However, in this study we can just observe the difference between the sectors, but we have no data connecting jobs to public versus private sectors. It might be that people in jobs that are more demanding perceive higher job satisfaction than vice versa, both in different occupational areas as well as in private and public sectors. Occupational level per se might be one factor promoting job satisfaction, but not the only one.

Non-linearity and an optimal ability level for each job level.

The third prediction stated: "There might be an optimal level of ability for each specific occupational level. Below this level, satisfaction may increase as a result of increasing ability. Above this level, satisfaction levels might decrease due to boredom, a feeling of wasting one's talents, etc", was partly supported from our findings. Overall, in the present study, there were very few significant relationships, whether a linear or a nonlinear model was applied. This is a surprise, since the importance of a high occupational level for job satisfaction has been suggested as well as the influence of a high ability to receive a high occupational level. A tendency was found that occupational level seems to be important for job satisfaction, as has been reported previously (see for example Wulff, Bergman & Sverke, submitted, Ganzach & Pazy, 2001; Hyllegard & Lavin, 1992). Moreover, Ganzach and Pazy (2001) have asserted that job complexity was important to perceived job satisfaction for the most intelligent people. But there is some findings that enriched work were not always a benefit to the employee (Oldham, Hackman & Pearce, 1976). The suggested possible non-linear

relationship between intelligence and satisfaction was not found. It was stated in the purpose section that if the complexity level of work matches the intelligence level of the individual it contributes to a higher satisfaction. This presumed effect will depend on individual complexity levels of the job and will be moderated by the other hypothesized predictions. This makes it rather difficult to arrive at any firm expectations about what non-linear relations to expect between intelligence and job satisfaction.

The results from an analysis of the importance of the relation between ability and the occupational level for perceived job satisfaction showed that, more clearly for men than for women, overachievers were more satisfied with their work than other groups. These findings are in contradiction to the expectation in the literature that an optimum balance between intelligence and the occupational level leads to the highest satisfaction. At middle age, when a person normally is established in his/her career, the results instead suggested the importance of a high occupational level and task complexity in relation to intelligence for perceived job satisfaction.

Gender differences

More men than women were working in the science–technical area and more women than men were working in the area of human service in the present study. This has been shown elsewhere. One possible explanation would appear to follow commonly held gender stereotypes (see for example Hyllegard & Lavin, 1992). Moore (1985) found that men exhibited extrinsic job satisfaction and valued such benefits as career advancement possibilities and status, which in turn often is associated with high salary incentives. Another explanation was from findings in Govier and Feldman (1999) who maintained it were different abilities, which were important in the great variety of work positions. For example, in technical jobs spatial ability was important and more men than women were recognized as spatially gifted.

Both women and men had different levels of job satisfaction and ability in different occupational levels in the study at hand and it was also true for different occupational areas. It is also supported from person-situation fit research (Caldewall & O'Reilly, 1990; Holland, 1959, 1966). As mentioned, the largest differences between the sexes were in intrinsic job satisfaction. A reason for the differences in intrinsic job satisfaction might be sex differences in interest or motivation. In extrinsic job satisfaction, there could be sex differences in pay or career possibilities. Those differences might exist because of attitudes, prejudices, stereotypes and sex roles. Another explanation is a segregated school system (Jonsson, 1997, 1999) which leads to a segregated labour market.

A high occupational level is often associated with high job satisfaction for both sexes (see for example Wulff, Bergman & Sverke, submitted). People in management position had the highest extrinsic job satisfaction in the study at hand. More men held managerial positions than women and there may be psychosocial factors that give men more opportunity to obtain management positions. In this study, management was divided into two categories: Top management and management of smaller firms. However, those working in smaller firms had in some cases more responsibility than an ordinary employee while in other cases not as much and there were more men than women working in smaller firms as well. Maybe, even if both sexes is comfortable on high occupational levels, leaderships positions might be under representative among women compared to men in this study as well as in the Swedish society in large.

There were tendencies of dissimilarities between the sexes in mean scores in ability and perceived job satisfaction in different occupational areas. Men had a greater variety in mean ability level in different occupational areas compared to the women, but ability seemed to be equally differentiated across occupational levels in both sexes. Particularly in job satisfaction, there were some differences between the various occupational areas/levels but, as previously mentioned, no consistent results were found of linearity. This might be seen in relation to the importance of job complexity (e.g. Ganzach & Pazy, 2001; Wulff, Bergman & Sverke, submitted). As mentioned, there were differences in job satisfaction across occupational areas for both sexes, and Greenfeld, Greiner and Wood (1980) found, that females in more male jobs had higher education and other values than other females. Other aspects are the mentioned explanation that women prefer the “right” area, the horizontal dimension, and men the prestige level, the vertical level (Magnusson, Dunér & Zetterblom, 1975). Maybe, the segregated labour market is one reason behind some of the findings. Another is unequal opportunities to let one’s vocational dreams come true. As mentioned, the vocational choices and dreams might include both occupational area and level.

Final comments and future perspective

There are differences in ability and job satisfaction across occupational areas, when occupational level is kept constant. Further, there is higher ability and job satisfaction in some occupational levels and occupational areas than others, as suggested in previous research. It seems as if childhood ability contributes to self-selection to more or less demanding and rewarding jobs (in terms of intrinsic and extrinsic job satisfaction). However, those who are overachievers seem to perceive higher job satisfaction than other groups, which may diminish the importance of ability and highlight the importance of occupational level to explain job satisfaction. But interests in the job (in terms of occupational area) may also contribute to job satisfaction.

Ability is known to be important for work performance and Lawler and Suttle (1973) found that ability in combination with expectancies were good predictors of work performance. However, in terms of positive job attitudes, it might be argued that role clarity contributes to a wish to stay on the job as does that the employee has realistic role perceptions. Wanous (1978) argued that work perceptions were important for tenure, otherwise the employee wanted to quit.

Different factors might contribute to perceived job satisfaction. Judge et al (2001) showed that work performance is important for job satisfaction, and that it was a rather strong causal relationship. The reason behind performance according to expectancy theory is expectancies of highly valued rewards (Hackman & Porter, 1968). The extrinsic and intrinsic rewards are assumed to correspond in part with extrinsic and intrinsic job satisfaction as measured in the study at hand, which might confirm the importance of work performance/occupational level for job satisfaction. Job satisfaction is to some extent dependent on ability, probably both indirectly (through education, occupational level, see Wulff, Bergman, Sverke, submitted) and directly. Personality has been shown to be related to job satisfaction (see e.g. Judge, Heller & Mount, 2002). Ability is undoubtedly a protective factor for success, but it is not the only significant factor. There could be a more multifactorial explanation to job satisfaction where these factors as well as other personality factors such as stress, work climate, and the general life situation contribute to job satisfaction.

In a future study it would be interesting to study the influence of stress and personality, and its contribution to the relationship between ability and job satisfaction. It merits further investigation to examine the possible influence of ability on stress management, and stress levels in different occupational levels and areas.

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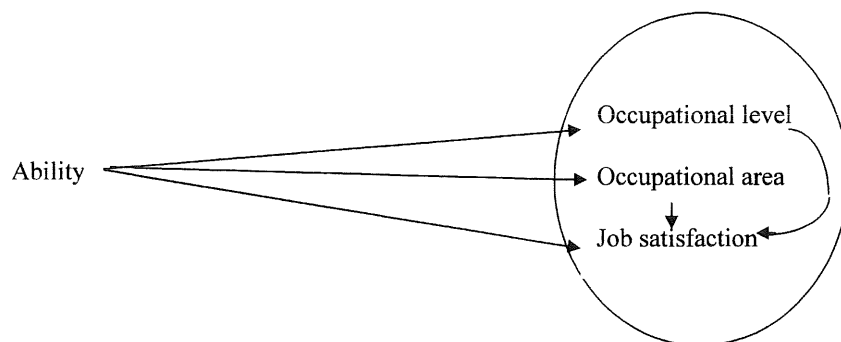


Figure 1. *The relation between ability and job satisfaction, with respect to occupational level and area.*