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# INTERROGATIVE SUGGESTIBILITY, TRAIT-RELATED AND MORPHOFEATURAL CHARACTERISTICS OF HUMAN PHENOTYPE

Master's Thesis

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Running Head: Interrogative suggestibility

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Abstract

The primary goal of this paper is to investigate whether interrogative suggestibility is related to certain personality traits in an Estonian sample of subjects ($N$ = 61; 20 men and 41 women; mean age = 20.6 years; $SD$ = 2.98) as well as to explore whether some facial characteristics (mood-related and/or trait-related) of persons belonging to this sample can be related to perceived or real suggestibility. Results show that the means and standard deviations for different suggestibility scores in a sample of Estonian population were all lower compared with those obtained in other European countries (UK, Poland, Iceland, Finland). No correlation of interrogative suggestibility with Big Five personality variables or state and trait anxiety were found. The only correlation that proved to be significant was between *yield2* and *shift* of interrogative suggestibility and low self-esteem. As for the perceived suggestibility (self-estimated and other-estimated), the results indicate that we are not very good at estimating our own as well as the others' level of suggestibility – correlations between interrogative suggestibility and self- or other-estimated suggestibility were both insignificant. But still there seems to exist certain socio-visual myths about highly suggestible or not suggestible faces – more child-like faces and faces with higher level of perceived merryness and lower level of perceived seriousness/angryness are evaluated as more suggestible ones.

Key words: Interrogative suggestibility; Personality; Perceived suggestibility

# SISENDATAVUS KÜSITLEMISEL, ISIKSUSOMADUSED JA NÄO MORFOLOOGILIS-TUNNUSLIKUD KARAKTERISTIKUD

## Kokkuvõte

Käesoleva töö põhieesmärgiks on uurida, kas sisendatavus küsitlemisel on Eesti populatsiooni (*N* = 61; 20 meest ja 41 naist; keskmine vanus = 20.6 eluaastat; *SD* = 2.98) puhul seotud teatud isiksusomadustega ning kas teatud näotunnuseid (morfoloogilisi ja/või ekspressiivseid) saab seostada tajutud või tegeliku sisendatavusega. Tulemused näitavad, et erinevate sisendatavuse skooride keskmised ja standardhälbed on uuritud Eesti valimil madalamad kui teistes Euroopa riikides (Suurbritannia, Island, Poola, Soome). Uurimus ei näidanud sisendatavuse ja Suure Viisiku isiksusomaduste vahelisi seoseid ega ka seoseid ärevusega (ehkki seda võinuks eeldada). Ainus seos, mis oluliseks osutus on sisendatavuse skaalade *yield2* ja *shift* ning madala enesehinnangu vahel. Rääkides tajutud sisendatavusest (enda poolt ja teiste poolt hinnatuna) võib uurimuse tulemusena öelda, et me pole väga head sisendatavuse hindajad ei enda ega ka teiste puhul. Sellegipoolest eksisteerivad teatud sotsio-visuaalsed müüdid selle kohta, milline näeb välja kõrge sisendatavusega või madala sisendatavusega inimene – lapselikena ning rõõmsailmelistena tajutud nägusid tajuti ka sisendavamatena kui täiskasvanulikena ning tõsistena tajutuid.

Märksõnad: sisendatavus küsitlemisel; isiksus; tajutud sisendatavus

Contents

## Introduction

The question of general credibility of eyewitnesses and validity of their statements has been in interest of psychologists and legal professionals over a century. It is known from the first studies of Cattell (1895) that suggestion has a direct influence upon human testimony (Bartol & Bartol, 1999). Binet (1900) and Stern (1910) elegantly demonstrated that suggestibility effects appear to be a function of situational and individual factors (Bartol & Bartol, 1999; Gudjonsson, 1992a). Nowadays the assessment of individual's level of interrogative suggestibility has becoming an important part of many forensic psychology reports (Gudjonsson, 1988a, 1995; Merckelbach, Muris, Wessel, & van Koppen, 1998; Munro & Carlin, 2002), as it may reveal individual's fitness to be interviewed and psychological vulnerability (Gudjonsson, Hayes, & Rowlands, 2000).

It seems timely and important to launch suggestibility research in the broader forensic context also in Estonia. As a first step, we should be interested whether some standard methods used in Europe and findings gathered about personality characteristics in relation to suggestibility can be replicated with Estonian subject samples.

There are two main theoretical approaches to interrogative suggestibility – „individual differences approach" and the „experimental approach" (Gudjonsson, 1992a; Schooler & Loftus, 1986). Individual differences approach views suggestibility as being dependent upon the coping strategies people can generate and implement when confronted with the *uncertainty* and *expectations* of the interrogative situation (Gudjonsson, 1992a). The main emphasis of the model is on explaining individual differences in interrogative suggestibility.

The experimental approach is illustrated by the work of Loftus and her colleagues and here the emphasis is on understanding the conditions under which leading questions are likely to affect the verbal accounts of witnesses (Loftus, 1979). Schooler and Loftus (1986) suggested that the two approaches should be viewed as complementary, not competitive or mutually exclusive.

Endres (1997) explains that the reason why American experimental psychologists have focused on the situational determinants of suggestibility whereas Continental European researches have been concerned with suggestibility as an individual trait may reflect the different roles of psychological experts in the Anglo-

American adversary justice system and the Continental inquisitory system. What still appears „alien and heretical“ (McGough, 1991, p.166) from the experience of American legal tradition, namely psychologists giving expert opinions on the credibility of a statement or a witness, has for decades been common legal practice in several European countries (for example Germany, Sweden, UK) (Endres, 1997).

Both aspects were clearly present in the pioneering work of Binet (1900), who treated eyewitness suggestibility as an indicator of hypnotic suggestibility and who discovered empirical evidence for the differential suggestive effects of various types of questions. The same view was held by William Stern (1926), who - in his later work - reviewed several forensic cases and concluded that suggestibility depends both on characteristics of the witness and of the interview situation (Gudjonsson, 1987; Hull, 1933).

McDougall (1928) associated suggestibility with four distinct conditions: (a) abnormal states of the brain (e.g., as during hypnosis, sleep and fatigue); (b) deficiency and poor organization of knowledge regarding the subject matter being communicated; (c) the impressive character of the person communicating the suggestion, and (d) the character and disposition of the subject.

Gudjonsson and Clark (1986) define interrogative suggestibility as „... the extent to which, within a closed social interaction, people come to accept messages communicated during formal questioning, as the result of which their subsequent behavioural response is affected“ (p.84). Interrogative suggestibility comprises two main aspects: the tendency to be (mis)led by leading questions, and the tendency to shift initial answers in response to negative feedback (Bull, 1995).

According to the theoretical model of Gudjonsson and Clark (1986) interrogative suggestibility bears little resemblance to other types of suggestibility and four main features that differentiate interrogative suggestibility from other types of suggestibility are as follows: (a) interrogative suggestibility involves a questioning procedure within a closed social interaction; (b) the questions asked are mainly concerned with past experiences and events, recollections and remembered states of knowledge. This makes it different from suggestibility of those types that are concerned with the motor and sensory experiences of the immediate situation; (c) interrogative suggestibility contains a strong component of uncertainty which is related to the cognitive processing capacity of the individual; (d) an important feature of interrogative suggestibility is that it commonly involves a highly stressful situation

with important consequences for a witness, victim or suspect (Gudjonsson & Clark, 1986).

According to Gudjonsson (1992a), the main hypotheses derived from the model are as follows:

1. interrogative suggestibility is a distinct type of suggestibility. It would not be expected to correlate with primary suggestibility as found in a hypnotic context;
2. suggestibility is a dynamic process that is potentially situation-bound (however the model recognizes that suggestibility can be reasonably stable over time because of the cognitive and personality factors that mediate suggestibility – stable individual differences in suggestibility can be measured reliably);
3. three components of suggestibility (uncertainty, interpersonal trust and expectation) can be manipulated to a certain degree by an interrogator;
4. interviewees who enter the situation with a suspicious cognitive set are likely to be less suggestible than those with trusting cognitive set;
5. the type of coping strategies people are able to use during interrogation affects their level of suggestibility;
6. poor memory and low intelligence make people generally more suggestible;
7. suggestibility is related to certain personality variables (low self-esteem, anxiety proneness, lack of assertiveness and fear of negative evaluation);
8. negative feedback can markedly affect interviewees' mood and make them more suggestible;
9. there are significant differences between the response alternatives of suggestible and non-suggestible individuals in response to negative feedback (Gudjonsson, 1992a).

According to this model there are two distinctive types of suggestibility which are especially important in forensic context. The first type relates to the work of Binet (1900) and Stern (1910) in the field of human testimony and its reliability. Here the focus is on the impact of leading or suggestive questioning on testimony (*yield*). The second type of suggestibility relates to the extent to which negative feedback or interrogative pressure can shift the answers (*shift*) (Gudjonsson, 1992a).

Gudjonsson (1992a, p.117) argues that these two aspects of suggestibility are conceptually distinct and „reasonably independent of each other“, but „ they are both mediated by similar factors, such as cognitive variables (memory, intelligence), anxiety, social factors, and coping skills. However, there is growing evidence that *yield 1* is *relatively* more related to cognitive variables, whereas *shift* is *relatively* more related to interpersonal and social factors“ (Gudjonsson, 1992a, p.413).

Evidence for stable individual differences comes from correlational studies. Gudjonsson (1992a) and several other authors have found substantial correlations between subjects' scores on Gudjonsson's test of interrogative suggestibility and different personality variables (anxiety, intelligence, self-esteem, and so forth).

In what follows let us look at some main variables that in principle could be related to suggestibility.

*Individual-Difference Factors in Interrogative Suggestibility*

Modern researches agree that not all individuals are equally likely to yield to the influence of suggestion (Eisen, Winogard, & Qin, 2002; Liebman, McKinley-Pace, Leonard, Sheesley, Gallant, Renkey, & Lehman, 2002). Some are more ready to accept misinformation and more influenced by negative feedback than others. A question that naturally arises is why some individuals are more suggestible than others – what factors account for individual differences in interrogative suggestibility? Are anything in the major personality traits (e.g., Big Five) related to inter-personal differences in suggestibility or are the differences, if any, more or less specific and minute?

*Suggestibility and Age*

Age is perhaps the most extensively examined individual-difference factor in suggestibility research. Taken as a whole, the data indicate that there is a clear developmental trend – young children, especially preschoolers, are significantly more suggestible than older children and adults (Ceci & Bruck, 1993, 1997) . Early ideas from Binet (1900) and Stern (1926) also point out that young children, and girls especially, were more suggestible (Hull, 1933). Binet (1900) argued that suggestibility reflects the operation of two different factors, one cognitive and the other social (Endres, 1997; Gudjonsson, 1992a).

Once children reach school age, suggestibility appears to decrease, although there is evidence that even adolescents may still be somewhat more suggestible than adults, especially when negative feedback is provided and leading questions are asked (Bull, 1995; Memon, Wark, Holley, Bull, & Koehnken, 1996). But even among children there exists great deal of variability while talking about suggestibility (McFarlane, Powell, & Dudgeon, 2002; Scullin, Kanaya, & Ceci, 2002).

There is also evidence that suggestibility increases once again when one grows older (e.g., over 60 years) (Ceci & Bruck, 1993; Coxon & Valentine, 1997).

*Suggestibility and Gender*

Results here are somehow controversial. Early studies of suggestibility indicate that "women and girls are probably more susceptible to direct suggestions than are men and boys, but only very slightly so" as states Hull (1933, p.101-102). Gudjonsson (1992a) has found that there seems to be some general tendency for females to score slightly higer on suggestibility than males, but the difference has not been found to be significant. Powers, Andriks and Loftus (1979) found that female subjects were significantly more suggestible than male subjects.

*Suggestibility and Intellectual Ability*

Studies on the relations between interrogative suggestibility and intelligence have yielded somewhat inconsistent results. Gudjonsson (1983) reported a negative relation between scores on the Gudjonsson Scale of Suggestibility (GSS; Gudjonsson, 1983) and intelligence, as measured by the Wechsler Adult Intelligence Scale (WAIS; Wechsler, 1955). Similar findings have been reported by Tully and Cahill (Eisen, Winogard, & Qin, 2002), and also by Pollard, Trowbridge, Slade, Streissguth, Laktonen, & Townes (2004), and Polczyk (2005). However Tata (1983) found no relations between scores on the GSS and intellectual abilities (Eisen, Winogard, & Qin, 2002). There was also no significant correlaton found between intelligence and suggestibility in an eyewitness experiment conducted by Powers, Andriks and Loftus (1979). Quoting Hull (1933) " the popular belief that suggestibility is a mark of stupidity or lack of intelligence appears to be wholly an error" (p.102).

Gudjonsson (1992a) speculates that these discrepant findings may come from the fact that intelligence might be most clearly related to suggestibility in participants with lower intellectual abilities. Based on his results, Gudjonsson (1983) proposed that people with low intellectual ability are more likely to become confused and uncertain when asked misleading questions, which leads to an increased likelihood of acquiescing to misleading questions (Eisen, Winogard, & Qin, 2002).

*Suggestibility and Anxiety*

Interrogative suggestibility appears to be significantly mediated by anxiety processes (Gudjonsson, 1988b). The general finding is that situational stress, that is state-anxiety, seems to be more important than trait anxiety (Gudjonsson, 1988b). But there are also studies that have found low but significant correlation between suggestibility and neuroticism (measured by the Eysenck Personality Questionnaire, EPQ) (Gudjonsson, 1983). Wolfradt and Meyer (1998) found that suggestibility correlated positively with both trait and state anxiety.

Kassin and Kiechel (1996) suggest that anxiety as it relates to suspect vulnerability should be investigated thoroughly. Although anxiety could be examined as either a situational or personal variable, Gudjonsson (1992a) recommends that state anxiety should be definitely investigated because compared to trait anxiety it has been linked to higher levels of suggestibility.

This recommendation is in accordance with the well-known idea from cognitive psychology that state anxiety affects cognitive processes (Ridley & Clifford, 2004). Eysenck and Calvo's (1992) processing efficiency theory posits that anxiety reduces cognitive capacity, as it "uses the resources of the central executive component of the working memory system" (Eyesenck, 1992, p.131).

*Suggestibility and Self-Esteem*

Studies of Gudjonsson and Lister (1984), Gudjonsson and Singh (1984) have found a negative relationship between self-esteem and suggestibility, which supports the theoretical model of Gudjonsson and Clark (1986) discussed earlier.

*Suggestibility and Big Five Personality Traits*

*Agreeableness.* There is some evidence that highly agreeable individuals are more likely than less agreeable individuals to make errors when answering misleading questions, especially in situatsions where social pressure is high (Eisen, Winogard, &

Qin, 2002). But as links between agreeableness and suggestibility have not been explored thoroughly, we can not make any far reaching conclusions.

*Neuroticism.* Gudjonsson (1983) has found a low but significant correlation between total suggestibility and neuroticism. Same results have been reported by Wolfradt and Meyer (1998). Haraldsson (1985) found no significant correlation between suggestibility scores and neuroticism (measured by the Eysenck Personality Questionnaire, EPQ).

*Extraversion.* Results here are controversial. Ward and Loftus (1985) found that introverts and intuitive individuals were more susceptible to misinformation, while Trouve' and Libkuman found extraverts to be more suggestible (Schooler & Loftus, 1993).

A Polish author Polczyk (2005) has found no correlation between interrogative suggestibility with neuroticism, extraversion, openness to experience, agreeableness and conscientiousness measured by NEO Five-Factor Inventory (NEO-FFI; Costa & McCrae, 1992).

Thus, we see that the results are inconclusive and by no means very robust.

*Suggestibility and Social Desirability*

Social desirability is usually associated with „lie scales", such as those measured by the Eysenck Personality Questionnaire (EPQ; Eyesenck & Eysenck, 1975), or in our case by NEC/V4 (Nõlvak & Pullmann, 2002).

In his early studies Gudjonsson (1983) found modest correlation between suggestibility and social desirability measured by EPQ Lie Scale (Gudjonsson, 1983). Similarly, low but significant correlations have been reported by several other authors (Haraldsson, 1985; Polczyk, 2005; Richardson & Kelly, 2004).

*Preface to Present Study*

As interrogative suggestibility has not been studied in Estonia so far, the present study serves as a first try in order to collect data in the field and to compare the results with those gathered in other European countries. Considerable normative data have been collecetd in the UK and Iceland, but also in Finland and Poland. The results from these countries indicate that no substantial cross-cultural differences in interrogative suggestibility have been found (Haraldsson, 1985; Polczyk, 2005; Santtila, Ekholm, & Niemi, 1998). So these findings can serve as a basis for our

assumption that in measures of suggestibility as related to other factors of psychological interest Estonian population does not differ from populations mentioned above, and that any differences that may occur will be within reasonable limits.

In addition, the present study explores another, more subjective aspect of suggestibility. While there is a considerable amount of research devoted to psychometric measurements of trait or state suggestibility, interpersonal perceived suggestibility as a research matter is clearly underrepresented. But this could also be an important aspect because deliberate attempts to engage into manipulative communication in a law-misobiding context or interrogator choices and expectations in a law-enforcing context could largely depend on how suggestible a person to be conversated with appears. The question under examination is whether some facial characteristics can be related to *perceived suggestibility*.

Research on facial perception has clearly demonstrated that faces serve as signals for underlying emotional states through their portrayal of facial expression (Bruce, 1988; Ekman, 1993; Ekman, 1997). It seems that face perception invokes attributional processes which go far beyond the information given. „Shown only a face, we are prepared and often inclined to judge a person's emotional state, personality traits, probable employment, and possible fate, and Lewicki's (1986) research has demonstrated how such attributional processes may be created by our unconscious assimilation of covariations between physical features and personality variables – covariations which may be perpetuated by stereotyped role portrayals in television and film" (Bruce, 1988, p.31), and why not in fairytales.

Studies in the field of perceived suggestibility are virtually non-existent – the author was not able to locate any published material on the topic. Even though the question *whether* and *why* one is *perceived* as highly suggestible or not suggestible may have a crucial role in various forensic situations (courtroom decision-making, police interrogations, and so forth). Such stereotypical attributions may be entirely unreliable, and far from being true and objective, but could nevertheless have important consequences. Someone with „highly suggestible" face may be questioned in more suggestive manner during police interrogations and vice versa - someone with "hardly suggestible" face would be left without serious interrogation or just the opposite – to be too forcefully treated.

Thus, the present study is interested both in objective and subjective measures of suggestibility, specifically explored in the Estonian context.

*Hypothesis 1: Suggestibility and Personality Variables*

Assuming that Estonian population is similar to other European countries we can hypothesize that suggestibility has significant relations with self-esteem, neuroticism, social desirability and state anxiety.

*Hypothesis 2: Suggestibility and Gender*

Though different authors declare somehow different results there exists a common intuition or social belief among specialists that women are more suggestible than men. Based on this we hypothesize that women score higher on suggestibility scale.

*Hypothesis 3: Perceived and Experimentally Measured Suggestibility*

Studies in the field of perceived suggestibility are virtually non-existent as discussed above, so in order to answer whether people are good in judging other people's suggestibility, we could hope that they are, and therefore we could hypothesize that there is a positive correlation between perceived and experimentally measured suggestibility. Yet, as the scattered research indicates a general unreliability and impreciseness of interpersonal human evaluations, the null-hypothesis will be applied predicting lack of correlation between experimentally measured suggestibility and the perceived suggestibility.

*Hypothesis 4: Suggestibility and Facial Characteristics*

In order to examine whether there exist certain mood- and trait-related facial features which are perceived to characterize (a) suggestible persons, and (b) non-suggestible persons, we should choose some perceptible facial characteristics (morphological and/or related to expressive features, that is "*morpho-featural*") that promise to be significant in perceptually evaluated suggestibility according to our interpretation of the earlier research results.

Thus, as age is known to correlate with suggestibility, we hypothesize (4a) that more child-like persons are perceived as more suggestible ones. Because agreeableness has been related to suggestibility it is reasonable to suppose that facial features that signal the potential for interpersonal agreement such as friendly or nice mood correlate with perceived suggestibility and thus we hypothesize (4b) that faces with higher level of perceived merryness and lower level of perceived

seriousness/angryness are evaluated as more suggestible ones. The same rationale can be applied to submissive-aggressive scale and so we can hypothize (4c) that faces perceived as more submissive are also perceived to be more suggestible.

## Method

### *Experiment I*

The main goal of Experiment I was to explore whether there exist relations between suggestibility and certain personality variables (self-esteem, emotional stability, conscientiousness, agreeableness, extraversion, openness to experience, social desirability, state and trait anxienty).

#### *Participants*

Participants were 61 undergraduate students (20 men, 41 women) from different universities in Tallinn (Tallinn Pedagogical University; Institue of Law, University of Tartu; Public Service Academy of Estonia). The mean age of participants was 20.6 (range 18-35 years), *SD* = 2.98.

Participants were told that they would participate in an experiment that studies relations between person' s memory and certain personality traits. They were also informed that one part of the experiment would be taking a photograph (this was actually a reason why some people refused to participate).

#### *Instruments*

1. *Gudjonsson Suggestibility Scale 2* (GSS2; Gudjonsson, 1997) employs a narrative paragraph describing a young boy losing control of his bike on a hill, which is read out to the subject. He or she is then asked to report all that can be recalled about the story (immediate recall and delayed recall can both be measured), he or she is asked 20 specific questions, 15 of which are misleading and suggestive. For example „*Was the boy frightened of the big van coming up the hill?*" when there was no mention of van in the story or „*Was the boy allowed to stay away from school on the day of the accident?*" when it was summer vacation or „*Did the boy on the bicycle pass a stop sign or traffic ligths?*" when he actually went through neither of the two.

After answering the 20 questions the person is told that he or she has made a number of errors (even if no errors have been made), and it is therefore necessary to ask all the questions once more. The wording of the negative feedback is :*„ You have made a*

*number of errors. It is therefore necessary to go through the questions once more, and this time try to be more accurate"*.

The scale provides four scores:

(1) Yield 1 - the extent to which people give in to misleading questions. The range of possible scores is 0-15.

(2) Yield 2 - the extent to which people give in to misleading questions after interrogative pressure (negative feedback). Again, the range of possible scores is 0-15.

(3) Shift – any change in response to all 20 questions after negative feedback. Possible shift scores range from 0 to 20.

(4) Total suggestibility – this is the sum of Yield 1 and Shift. Therefore the range of scores is 0-35.

The internal consistency of the Yield1, Yield2 and Shift subscales were 0.87, 0.90 and 0.79, respectively (Gudjonsson, 1992b).

The scale has not been adapted and validated in Estonia as yet. Therefore, we have to postulate that we use it as a means to gather data as dependent variables in a quasi-experiment where GSS2 text and questions are regarded as independent variables. We also postulate that translation into Estonian has not changed the meaning of the text for the representatives of another European culture who are used as experimental subjects.

2. *Estonian version of the Rosenberg Self-Esteem Scale* (ERSES; Pullmann & Allik, 2000). This 10-item scale was administred to participants to assess the level of global self-esteem. The participants responded to the items on a 5-point Likert type scale anchored by 1 (*strongly disagree*) to 5 (*strongly agree*). Higer scores represent higher levels of self-esteem. The internal reliability of the scale was $\alpha = 0.84$.

3. *State-Trait Anxiety Inventory* (STAI; Spielberger, 1983) is a self-report assessment device which includes separate measures of state and trait anxiety. The participants have to respond to the 40 items on a 4-point Likert type scale. Scores on the STAI have a direct interpretation: high scores on their respective scales mean more trait or state anxiety and low scores mean less. STAI has not been adapted and validated in Estonia, but as it is considered to be one of the best measures of state anxiety, and the Estonian translation of STAI has been used in many anxiety studies with great success before, we decided to add it to the battery of questionnaires in our study also.

4. *NEC/V4* (Nõlvak & Pullmann, 2002). To examine relations between interrogative suggestibility and certain personality dimensions, the shortened version of the Revised

NEO Personality Inventory, NEC/V4 (Nõlvak & Pullmann, 2002) was administered to all participants. NEC/V4 is a 85-item questionnaire which measures the five major domains of personality: *Emotional Stability*, *Conscientiousness*, *Agreeableness*, *Extraversion* and *Openness to Experience*. Responses were coded on a 5-point scale ranging from 1(false) to 5 (true). The Cronbach alpha values were 0.85, 0.78, 0.76, 0.83 and 0.80 for the scales, respectively. Lie-scale is also added to the inventory in order to measure the tendency of individuals to present themselves in socially favourable terms (*Social Desirability*).

*Procedure*

The participants were asked to fill in a battery of questionnaires (*ERSES*; *NEC/V4*; *STAI*) by also providing standard demographic information about their gender, age and educational background.

One question, where participants were asked to estimate their own level of suggestibility on a 5-point Likert type scale ranging from 1 (*I am not suggestible*) to 5 (*I am very suggestible*) was added later to the battarey of questionnaires.

Testing was performed within small groups of 10 -15 persons in each.

In order to administer the *Gudjonsson Suggestibility Scale 2* (GSS2) and take a photograph, individual appointments were made with each one of the participants. The GSS2 was administered in accordance with the recommendations made by Gudjonsson (1997). Participants were instructed to listen to a short story and to listen very carefully as they would be asked to recall as much as possible afterwards. The experimenter then read the narrative aloud to the participant, followed by the request to provide free recall (in written form). The only deviation from the standard procedure was that no delayed recall (usually after 50 minutes) was measured.

After administering the GSS2, standardized digital photographs were taken of each of the participant (head and shoulders) in front-view using digital camera Olympus C-310 Zoom. Face images were in color and approximately 1600×1200 pixels in size.

The only instruction before photographing was a request to hold their usual neutral facial expression while posing, and not move. All the photos were retouched with ACDSee 7.0 software to standardize their frame, size, background and whenever possible, contrast.

All testing and photographing sessions were conducted by the author.

## *Experiment II*

The main goal of Experiment II was to explore whether certain facial features (morphological and expressive) could exist which are perceived to characterize (a) suggestible persons, and (b) non-suggestible persons, and if these features can be revealed, how does the perceived suggestibility relate to the "real" (psychometrically measured) suggestibility measured by the GSS2.

### *Participants and Procedure*

101 students (55 men and 46 women; mean age = 26.6 years, *SD* = 7.79, range = 17-51) from Public Service Academy of Estonia were asked to evaluate the black and white photographs of participants from Experiment I by producing a rating on a rating-scale.

61 photographs were displayed on a computer monitor one at a time in random order to the students and the task was to evaluate *how suggestible or not suggestible, in their opinion, was the person shown to them.*

Brief explanation of the term *suggestibility* was given before the evaluation procedure in order to avoid possible misunderstandings. The participants evaluated photographs on a 7-point Likert type scale ranging from 1 (*not suggestible at all*) to 7 (*highly suggestible*).

## *Experiment III*

The main goal of Experiment III was to explore whether facial appearance can be related to perceived suggestibility. Or being more specific - whether there are some mood- or trait-related (or both) morpho-featural characteristics which are related to perceived suggestibility.

For further analyses subjects were assigned to high ($N = 24$), moderate ($N = 23$) and low ($N = 14$) interrogative suggestibility groups on the basis of a tripartite split. Those on or above the 0.66 percentile of the sample group (scores $\geq 6$) constituted the high suggestibility group, and those on or below the 0.33 percentile (scores $\leq 1$ ) formed the low suggestibility group.

*Participants and Procedure*

75 students (60 men and 15 women; mean age = 32.1 years, *SD* = 4.6, range = 22-46) from Public Service Academy of Estonia were asked to evaluate 16 photographs. Photographs were displayed on a computer monitor one at a time in random order to the students.

Four of these photographs were *morphs* (see description and photos below), each consisting of eight photos (morph 1 – eight females perceived as highly suggestible; morph 2 – eight females perceived as not suggestible; morph 3 – eight males perceived as highly suggestible; morph 4 – eight males perceived as not suggestible).

Other 12 photographs were ordinary photos of subjects *perceived as highly suggestible* (three males + three females) and *perceived as not suggestible* (three males + three females).

The participants were not aware of the fact that some photos presented to them were not standard photos but morphed ones. They evaluated photographs using semantical-differential scales and the adjective-items used were as follows: merry *versus* serious; childlike *versus* adult- like; optimistic *versus* pessimistic; submissive *versus* aggressive; benevolent *versus* angry.

*Description of the Morphing-Procedure*

*Morphing* (short for *metamorphosis*) is a technique which allows a smooth transformation from one image through to another using a fixed set of coordinates for both images (Bruce & Young, 1998). The reason why we decided to use morphing technique in our study was that morphing has become a standard procedure in most face recognition and categorization studies.

Using a morphing software (*Morpher 3.1*, freeware), new 50:50 percent compound images were generated from each two original faces using a binary tree scheme and following the order of the perceived suggestibility values for the faces. For example, a compound image (f1-2) was generated by combining the *least suggestible female face* (f1) with the second-least suggestible female face (f2); in a next step, f3 and f4 were combined to f3-4, and so on. The next generation of pictures was then produced by combining f1-2 and f3-4 to f1-4, then f1-4 with f5-8 to f1-8 and so on, resulting in one single compound image f1-8 for the 8 least suggestible female.

Same procedure was repeated with eight *most suggestible female faces*, eight *most suggestible male faces* and eight *least suggestible male faces*.

It is important to notice that participants who evaluated photos (both standard and morphed) did not make any suspicious comments about morphed faces. The only comments made were about the quality of some photos (which happened to be the morphed ones).

*Figure 1.* Left: morphed female face, made of eight female faces perceived least suggestible; right: morphed male face, made of eight male faces perceived least suggestible.

*Figure 2.* Left: morphed female face, made of eight female faces perceived most suggestible; right: morphed male face, made of eight male faces perceived most suggestible.

## Results

*Relations between Suggestibility and Personality Characteristics*

Descriptive statistics, including means, standard deviations, and range for the measures of different suggestibility and personality variables, are reported in Table 1.

The means for the scores on the GSS2 are all lower compared to the values reported by Gudjonsson in the manual (See Table 2; Gudjonsson, 1997). One possible reason for that may be the homogeneity of subjects sample in the present study (participants all being undergraduate students, mean age was 20.6; range 18-35 years; *SD* = 2.98, while in UK sample mean age was 30; range 16-69; *SD* = 8.8), with subjects derived from a group not particularly suggestible; on the other hand, if this is the case, it only adds rigour to our results.

Table 1

*Means, standard deviations, and range for the GSS2 and individual differences measures (N = 61)*

| | M | SD | Range |
|---|---|---|---|
| Immediate Free Recall | 23.03 | 3.52 | 16-34 |
| Yield 1 | 1.67 | 1.83 | 0-8 |
| Yield 2 | 1.31 | 1.26 | 0-4 |
| Shift | 1.72 | 1.32 | 0-5 |
| Total Suggestibility | 3.36 | 2.61 | 0-11 |
| | | | |
| Emotional Stability | 38.85 | 9.95 | 16-60 |
| Extraversion | 50.48 | 8.69 | 33-65 |
| Conscientiousness | 41.00 | 6.92 | 16-53 |
| Agreeableness | 41.13 | 6.50 | 25-55 |
| Openness to Exper. | 32.38 | 5.73 | 16-42 |
| Social Desirability | 8.25 | 2.42 | 5-16 |
| Self-Esteem | 31.00 | 6.88 | 8-40 |
| State-Anxiety | 34.10 | 11.24 | 21-79 |
| Trait-Anxiety | 40.10 | 11.01 | 22-72 |

Table 2

*Means and standard deviations for the GSS2 in UK sample (N = 83) (Gudjonsson, 1997)*

| | M | SD |
|---|---|---|
| Immediate Free Recall | 19.7 | 6.1 |
| Yield 1 | 4.5 | 3.6 |
| Yield 2 | 5.5 | 4.0 |
| Shift | 3.0 | 3.0 |
| Total Suggestibility | 7.5 | 5.3 |

Spearman's correlation coefficients were calculated among different suggestibility and personality variables (Table 3).

Table 3

*Correlations between the different suggestibility variables and personality variables (N = 61)*

| | Yield 1 | Yield 2 | Shift | Immediate Free Recall | Total Suggestibility |
|---|---|---|---|---|---|
| Yield 1 | | **0.47**** | **0.41**** | -0.24 | **0.89**** |
| Yield 2 | | | **0.89**** | -0.16 | **0.78**** |
| Shift | | | | -0.16 | **0.77**** |
| Immed. Free Recall | | | | | -0.24 |
| Total Suggestibility | | | | | |
| | | | | | |
| Emotional Stability | -0.15 | -0.13 | -0.15 | 0.02 | -0.17 |
| Extraversion | -0.04 | -0.14 | -0.13 | 0.07 | -0.08 |
| Conscientiousness | -0.01 | -0.21 | -0.19 | -0.09 | -0.11 |
| Agreeableness | -0.05 | 0.06 | 0.01 | 0.00 | -0.00 |
| Openness to Exper. | 0.05 | -0.02 | -0.01 | -0.04 | 0.05 |
| Social Desirability | -0.02 | 0.06 | 0.06 | -0.08 | 0.02 |
| Self-Esteem | -0.19 | **-0.32*** | **-0.29*** | 0.08 | -0.24 |
| State-Anxiety | 0.03 | 0.14 | 0.20 | 0.02 | 0.11 |
| Trait-Anxiety | 0.19 | 0.20 | 0.16 | -0.09 | 0.18 |

* Correlation is significant at the 0.05 level (two-tailed)
** Correlation is significant at the 0.01 level (two-tailed)

As can be seen from the results, the only correlation between suggestibility and personality variables that proved to be significant was between yield 2 and shift of suggestibility and the self-esteem. Subjects with lower level of self-esteem are prone to be more suggestible in terms of interrogative suggestibility, especially when leading questions are asked and negative feedback is given.

The main personality traits measrued by NEC/V4 (Nõlvak & Pullmann, 2002) did not correlate with suggestibility in our study. Whether this indicates that suggestibility might be involved in a new, separate personality factor or is this result a peculiarity of the present study should be investigated in future research.

*Relations between Different Measures of Suggestibility and Gender*

A comparison of male and female participants' total scores on interrogative suggestibility (3.15 and 3.46, respectively) showed no significant differences [*Kolmogorov-Smirnov Z* = 0.44; *asymp.sig. (2-tailed)* = 0.99].
Males' and females' mean scores on yield1, yield2, shift and immediate free recall had also no significant differences. Yet the tendency points in the typical direction.

Table 4

*Means and standard deviations for the GSS2 measures in male and female participants*

| | Male (N = 20) | Female (N = 41) |
|---|---|---|
| Yield 1 | 1.2 (SD = 1.15) | 1.9 (SD = 2.06) |
| Yield 2 | 1.55 (SD = 1,28) | 1.2 (SD = 1.25) |
| Shift | 1.95 (SD = 1.32) | 1.61 (SD = 1.32) |
| Immed. Free Recall | 24 (SD = 4.17) | 24.05 (SD = 3.22) |
| Total Suggestibility | 3.15 (SD = 2.03) | 3.46 (SD = 2.87) |

*Correlations between Self-Estimated and Experimentally Measured Suggestibility*

As was said earlier, one question, where participants were asked to estimate their own level of suggestibility on a 5-point Likert type scale (1 = *I am not suggestible*; 5 = *I am very suggestible*) was added to the battery of questionnaires. Mean for self-estimated suggestibility was $M = 2.85$, $SD = 0.61$ ($N = 60$).

26.2% of subjects rated themselves to be *not suggestible*, 60.7% declared themselves to be as *suggestible in certain degree* and 11.5% said they are *suggestible*.

An analysis using Spearman's correlation coefficient revealed that correlation between self-estimated and experimentally measured suggestibility was insignificant, $r = 0.15$ ($p = 0.26$), showing that participants are not able to estimate their own suggestibility accurately. The result like that was quite predictable -- it seems only human not to be good at making voluntarily self-discriminating statements.

*Facial Perceived Suggestibility and Experimentally Revealed Suggestibility*

The correlation between facial perceived and experimentally measured suggestibility was extremely low, $r = -0.06$ ($p = 0.65$), indicating that people are not good in recognizing highly suggestible or not suggestible persons by facial morpho-featural cues only. There is actually nothing surprising in the finding, of course, because a lot of research has been done in the field of social perception and the results clearly indicate that we are very inaccurate at judging personality, intelligence and many other psychological characteristics from appearance (for reviews, see Bull & Rumsey, 1988; Bruce & Young, 1998).

*Facial Perceived Suggestibility and its Correlations with Certain Mood- and Trait-Related Facial Features*

Table 5 presents the results from Experiment III. Spearman's correlation coefficients were calculated among facial perceived suggestibility and certain mood- and trait-related facial features.

Table 5

*Correlations between facial perceived suggestibility and certain mood- and trait-related facial features (N = 16)*

| | Merry-Serious | Childlike-Adult like | Optimistic-Pessimistic | Submissive-Agressive | Benevolent-Angry | Facial Perceived Suggestibility |
|---|---|---|---|---|---|---|
| Merry-Serious | | 0.45 | **0.89**** | **0.82**** | **0.88**** | **-0.66*** |
| Childlike-Adult like | | | 0.41 | **0.51*** | 0.45 | **-0.72**** |
| Optimistic-Pessimistic | | | | **0.87**** | **0.95**** | -0.56 |
| Submissive-Agressive | | | | | **0.96**** | -0.47 |
| Benevolent-Angry | | | | | | -0.52 |
| Facial Perceived Suggestibility | | | | | | |

* Correlation is significant at the 0.05 level (two-tailed)
** Correlation is significant at the 0.01 level (two-tailed)

Results (see Table 5) indicate clearly that faces which were estimated to be less merry and more serious were also perceived to be less suggestible ($r = -0.66$; $p = 0.05$). Same applies to faces estimated to be more adult-like ($r = -0.72$; $p = 0.01$). Correlations for other mood-related facial features were also high, but proved not to be statistically significant, most probably due to limited sample size and noise in data.

## Discussion

The present study was conducted in order to investigate a possible relationship between interrogative suggestibility and some personality traits (*extraversion, emotional stability, agreeableness, conscientiousness, openness to experience, social desirability, state anxiety, trait anxiety, self esteem*) as well as to explore whether there exist certain mood- or trait-related (or both) facial features which could be related to perceived or experimentally measured suggestibility.

The results indicate that the means and standard deviations for different suggestibility scores (*yield1, yield2, shift*) in a sample of Estonian population were all lower compared with those obtained in British samples (Gudjonsson, 1997). One possible reason for that may be the homogeneity of subjects in the present study (participants all being undergraduate students). The other possibility, to be hopefully studied in future studies, is that Estonians in general are less suggestible than the representatives of some other cultures or genotypes. (Indeed, Estonians are reputed to be stubborn.)

One disappointing aspect of the present study is that no correlation between different suggestibility scores (*GSS2*) and the five personality factors from the *NEC/V4* were detected. This outcome is actually similar to the findings of Liebman and others (2002), and Polczyk (2005), and may indicate that interrogative suggestibility is independent from the basic personality traits as was stated by Polczyk (2005). Whether this could suggest another independent dimension of personality or is it just a small "idiosyncrasy" of personality domain is unclear at present.

State and trait anxiety measured by *STAI* (Spielberger, 1983) had no significant correlation with measures of interrogative suggestibility as well. Same results are obtained by Polczyk (2005), who considered the fact intriguing, because "such a relationship has been noted in the literature and does make sense from the theoretical point of view" (p.184). Gudjonsson and Clark (1986) have emphasized that the necessary conditions for the suggestibility to occur are uncertainity about the correct answer, trust in the interviewer, and the reluctancy to declare the uncertainity. So high anxiety (and also low self-esteem, which will be discussed below) may therefore increase the suggestibility of a person by making the interviewee more prone to try to please the interviewer as well as more vulnerable to any negative social feedback (Santtila, Ekholm, & Niemi, 1999).

One of the reasons why no correlation between suggestibility and high state - anxiety was detected may, of course, be the fact that the experimental situation was not stressful enough and there was no need for participants to feel anxious because stakes were not high for them. Several studies have tried to solve this problem by inducing anxiety to participants before measuring suggestibility, for example presenting anxiety-provoking stimulus or video-taping the testing procedure and thus creating a more tense atmosphere (Forrest, Wadkins, & Miller, 2002; Ridley & Clifford, 2004).

As can be seen from the results, the only correlation that proved to be significant between interrogative suggestibility and various personality variables, was between yield2 and shift of suggestibility and the self-esteem measured by *ERSES* (Pullmann & Allik, 2000) . Estonian subjects with lower level of self-esteem are prone to be more suggestible in terms of interrogative suggestibility, especially when leading questions are asked and negative feedback is given. Same results have been reported by Gudjonsson (1992a) and the results indicate that feelings of powerlessness and incompetence are particularly effective in inducing suggestibility. As noted by Campell (1990) people with lower self-esteem have self-knowledge structures that are less clearly defined, less temporally stable and less internally consistent than those of individuals with higer self-esteem (Pullmann & Allik, 2000). „Therefore, people with low self-esteem are more susceptible to and dependent on the social enviroment which, in turn, leads to their greater sensitivity to self-intimidating and anxiety-provoking stimuli“ (Pullmann & Allik, 2000, p.712), as it is also the case during *GSS*.

In the context of law-obedience, the clear correlation between low self-esteem and high suggestibility means that in order to build in youngsters psychological states that are resistant to peer pressure in delinquent or criminal groups, parents, teachers and parole officers should try build self-confidence and feeling of success in the subjects they are caregivers for.

As for about more subjective measures of suggestibility (self-estimated and other-estimated), the results indicate that we are not very good at estimating our own as well as the others' level of suggestibility – correlations between interrogative suggestibility and self- or other-estimated suggestibility were both insignificant. Thus we can agree with the results from many social perception studies, that although we are very quick to judge people based on their physical appearance (especially face), our judgements tend to be far from the actual truth (Bruce, 1988; Bruce & Young,

1998). But still there seems to be a good deal of agreement about the judgements we make. Different studies in the field demonstrate that our judgements about „intelligent face“ or „criminal face“ or „attractive face“ tend to be suprisingly similar. Our search for „suggestible“ and „not suggestible“ face lead us to similar, consensual results – faces that were perceived to be more child-like and merry, were also perceived to be more suggestible. The opposite applies to „not suggestible faces“ which were perceived to be also more adult-like and serious. Thus we have to ask ourselves how much these kind of social belifs can affect the effectiveness of communication in various forensic situations (police interrogations, courtroom decision-making, and so forth). Could it mean that people who are perceived to be more suggestible are being interrogated in a more dominant manner, or opposite – because of being perceived more child-like they are easily considered to be innocent? The question remains to be studied in future research.

In conclusion, we can say that although *Gudjonsson Suggestibility Scale* has been criticized, because it is based on a verbally presented story that is quite unlike most real criminal incidents, perhaps limiting its validity (Milne, Clare, & Bull, 2002), it is still one of the best instruments for measuring interrogative suggestibility. Keeping the future in perspective, Calicchia and Santostefano (2004) propose that while clinicians, police, and the courts mostly deal with testimony encoded from visual and multimodal perspectives, it would be wise to start assessing interrogative suggestibility when the context is a real life event, not just a read-out-loud story.

References

Bartol, C.R., & Bartol, A.M. (1999). History of Forensic Psychology. In Hess, A.K., & Weiner, I.B. (Eds.) *The Handbook of Forensic Psychology.* John Wiley & Sons, Inc., 3-23.

Bruce, V. (1988). *Recognizing Faces*. Lawrence Erlbaum Associates, Publishers.

Bruce,V., & Young, A. (1998). *In the Eye of the Beholder: The Science of Face Perception.* Oxford University Press.

Bull, R. (1995). Interviewing Children in Legal Contexts. In Bull, R. & Carson, D. (Eds.) *Handbook of Psychology in Legal Contexts*. John Wiley & Sons, Inc., 235-246.

Bull, R., & Rumsey, N. (1988). *The Social Psychology of Facial Appearance.* New York: Springer-Verlag.

Calicchia, J.A., & Santostefano, S. (2004). The Assessment of Interrogative Suggestibility in Adolescents: Modalities, Gender, and Cognitive Control. *North American Journal of Psychology, 6 (1),* 1-12.

Ceci, S. J., & Bruck, M. (1993). Suggestibility of the Child Witness: A Historical Review and Synthesis. *Psychological Bulletin, 113*, 403-439.

Ceci, S.J., & Bruck, M. (1997). The Suggestibility of Young Children. *Current Directions in Psychological Science, 6 (3),* 75-80.

Costa, P.T., & McCrae, R.R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five Factor Inventory (NEO-FFI).* Odessa, Florida: Psychological Assessment Inventories.

Coxon, P., & Valentine, T. (1997). The Effects of the Age of Eyewitness on the Accuracy and Suggestibility of their Testimony. *Applied Cognitive Psychology,11,* 415-430.

Eisen, M.L., Winograd, E., & Qin, J. (2002). Individual Differences in Adults' Suggestibility and Memory Performance. In Eisen, M.L., Quas, J.A., & Goodman, G.S. (Eds.) *Memory & Suggestibility in the Forensic Interview*. Lawrence Erlbaum Associates, Inc., 205-233.

Ekman, P. (1993). Facial Expression & Emotion. *American Psychologist*, *48 (4),* 384-392.

Ekman, P. (1997). Should We Call it Expression or Communication? *Innovations in Social Research, 10 (4),* 333-344.

Endres, J. (1997). The Suggestibility of the Child Witness: The Role of Individual Differences and Their Assessment. *The Journal of Credibility Assessment and Witness Psychology*, *1 (2),* 44-67.

Eysenck, H.J., & Eysenck, S.B.G. (1975). *The Eysenck Personality Questionnaire*. London: Hodder & Stoughton.

Eysenck, M.W. (1992). *Anxiety: The Cognitive Perspective*. Lawrence Erlbaum Associates: Hove.

Forrest, K.D., Wadkins, T.A., & Miller, R.L. (2002). The Role of Preexisting Stress on False Confessions: An Empirical Study. *The Journal of Credibility Assessment and Witness Psychology, 3 (1),* 23-45.

Gudjonsson, G. (1983). Suggestibility, Intelligence, Memory Recall and Personality: an Experimental Study. *British Journal of Psychiatry,142*, 35-37.

Gudjonsson, G. (1987). Historical Background to Suggestibility: How Interrogative Suggestibility Differs from Other Types of Suggestibility. *Personality and Individual Differences, 8 (3),* 347-355.

Gudjonsson, G. (1988a). Retraced Confessions: Legal, Psychological and Psychiatric Aspects. *Medicine, Science and The Law*, *28 (3),* 187-194.

Gudjonsson, G. (1988b). Interrogative Suggestibility: Its Relationship with Assertiveness, Social-Evaluative Anxiety, State Anxiety and Method of Coping. *British Journal of Clinical Psychology*, *27*, 159-166.

Gudjonsson, G. (1992a). *The Psychology of Interrogations, Confessions and Testimony*. Chichester: John Wiley & Sons.

Gudjonsson, G. (1992b). Interrogative Suggestibility: Factor Analysis of the Gudjonsson Suggestibility Scale 2 (GSS2). *Personality and Individual Differences, 13*, 479-481.

Gudjonsson, G. (1995). Psychology and Assessment. In Bull, R. & Carson, D. (Eds.) *Handbook of Psychology in Legal Contexts*. John Wiley & Sons, Ltd, 55-66.

Gudjonsson, G. (1997). *Gudjonsson Suggestibility Scale II Manual*. London: Psychology Press.

Gudjonsson, G., & Lister, S. (1984). Interrogative Suggestibility and its Relationship with Perception of Self-Concept and Control. *Journal of Forensic Science Society, 24,* 99-110.

Gudjonsson, G., & Singh, K.K. (1984). Interrogative suggestibility and Delinquent Boys: an Empirical Validation Study. *Personality and Individual Differences, 5,* 425-430.

Gudjonsson, G., & Clark, N.K. (1986). Suggestibility in Police Interrogations: a Social Psychological Model. *Social Behavior, 1*, 83-104.

Gudjonsson, G., Hayes, G.D., & Rowlands, P. (2000). Fitness to be Interviewed and Psychological Vulnerability: The View of Doctors, Lawyers and Police Officers. *The Journal of Forensic Psychiatry*, *11 (1),* 74-92.

Haraldsson, E. (1985). Interrogative Suggestibility and its Relationship with Personality, Perceptual Defensiveness and Extraordinary Beliefs. *Personality and Individual-Differences*, *6 (6),* 765-767.

Hull, C.L. (1933). *Hypnosis and Suggestibility: An Experimental Approach*. New York: Appleton Century Crofts.

Kassin, S.M., & Kiechel, K.L. (1996). The Social Psychology of False Confessions: Compliance, Internalization, and Confabulation. *Psychological Science, 7 (3),* 125-128.

Liebman, J.I., McKinley-Pace, M.J., Leonard, A.M., Sheesley, L.A, Gallant, C.L., Renkey, M.E., & Lehman, E.B. (2002). Cognitive and Psychosocial Correlates of Adults' Eyewitness Accuracy and Suggestibility. *Personality and Individual Differences, 29*, 1133-1140.

Loftus, E. (1979). *Eyewitness Testimony*. Cambridge: Harvard University Press.

McDougall, W. (1928). *An Introduction to Social Psychology*. Methuen, London.

McFarlane, F., Powell, M.B., & Dudgeon, P. (2002). An Examination of the Degree to which IQ, Memory Performance, Socio-Economic Status and Gender Predict Young Children's Suggestibility. *Legal and Criminological Psychology, 7*, 227-239.

McGough, L.S. (1991). Commentary: Assessing the Credibility of Witnesses' Statements. In Doris, J. (Ed.) *The Suggestibility of Children's Recollections.* American Psychological Association.

Memon, A., Wark, L., Holley, A., Bull, R., & Koehnken, G. (1996). Reducing Suggestibility in Child Witness Interviews. *Applied Cognitive Psychology, 10*, 503-518.

Merckelbach, H., Muris, P., Wessel, I., & van Koppen, P.J. (1998). The Gudjonsson Suggestibility Scale (GSS): Further Data on its Reliability, Validity, and Metacognition Correlates. *Social Behavior and Personality, 26 (2),* 203-210.

Milne, R., Clare, I.C.H., & Bull, R. (2002). Interrogative Suggestibility among Witnesses with Mild Intellectual Disabilities: the Use of an Adaptation of the GSS. *Journal of Applied Research in Intellectual Disabilities, 15,* 8-17.

Munro, F.M., & Carlin, M.T. (2002). Witness Competency – Truthfulness and Reliability Assessment: the Role of the Psychologist. *Legal and Criminological Psychology, 7 (1),* 15-23.

Nõlvak, A., & Pullmann, H. (2002). *Isiksuseküsimustik NEC, v2.* Testi manuaal, Tripod Grupp OÜ.

Polczyk, R. (2005). Interrogative Suggestibility: Cross-Cultural Stability of Psychometric and Correlational Properties of the Gudjonsson Suggestibility Scales. *Personality and Individual Differences,38*,117-186.

Pollard, R., Trowbridge, B., Slade, P.D., Streissguth, A.P., Laktonen, A., & Townes, B.D. (2004). Interrogative Suggestibility in a US Context: Some Preliminary Data on Normal Subjects. *Personality and Individual Differences, 37*, 1101-1108.

Powers, P.A., Andriks, J.L., & Loftus, E.F. (1979). Eyewitness Account of Females and Males. *Journal of Applied Psychology, 64*, 339-347.

Pullmann, H., & Allik, J. (2000). The Rosenberg Self-Esteem Scale: its Dimensionality, Stability and Personality Correlates in Estonia. *Personality and Individual Differences, 28*, 701-715.

Richardson, G., & Kelly, T.P. (2004). A Study in the Relationship Between Interrogative Suggestibility, Compliance and Social Desirability in Institutionalised Adolescents. *Personality and Individual Differences, 36 (2),* 485-495.

Ridley, A.M., & Clifford, B.R. (2004). The Effects of Anxious Mood Induction on Suggestibility to Misleadind Post-Event Information. *Applied Cognitive Psychology, 18,* 233-244.

Santtila, P., Ekholm, M., & Niemi, P. (1998). Factors Moderating the Effects of Alcohol on Interrogative Suggestibility. *Psychology, Crime & Law, 4,* 139-152.

Santtila, P., Ekholm, M., & Niemi, P. (1999). The Effects of Alcohol on Interrogative Suggestibility: the Role of State-Anxiety and Mood States as Mediating Factors. *Legal and Criminological Psychology, 4*, 1-13.

Schooler, J.W., & Loftus, E.F. (1986). Individual Differences and Experimentation: Complementary Approaches to Interrogative Suggestibility. *Social Behavior, 1*, 105-112.

Schooler, J.W., & Loftus, E.F. (1993). Multiple Mechanisms Mediate Individual Differences in Eyewitness Accuracy and Suggestibility. In Puckett, J.M., & Reese, H.W. (Eds.) *Mechanisms of Everyday Cognition*. Hillsdale, NJ:Erlbaum, 177-203.

Scullin, M.H., Kanaya, T., & Ceci, S.J. (2002). Assessing Suggestibility Across Multiple Dimensions. *Journal of Experimental Psychology: Applied, 8*, 233-246.

Spielberger, C.D. (1983). *Manual for the State-Trait Anxiety Inventory (STAI)*. PaloAlto, CA: Consulting Psychologists Press.

Ward, R.A., & Loftus, E.F. (1985). Eyewitness Performance in Different Psychological Types. *The Journal of General Psychology, 112,* 191-200.

Wechsler, D. (1955). *Manual for the Wechsler Adult Intelligence Scale (WAIS).* New York: The Psychological Corporation.

Wolfradt, U., & Meyer, T. (1998). Interrogative Suggestibility, Anxiety and Dissociation Among Anxious Patients and Normal Controls. *Personality and Individual Differences, 25 (3),* 425-432.

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