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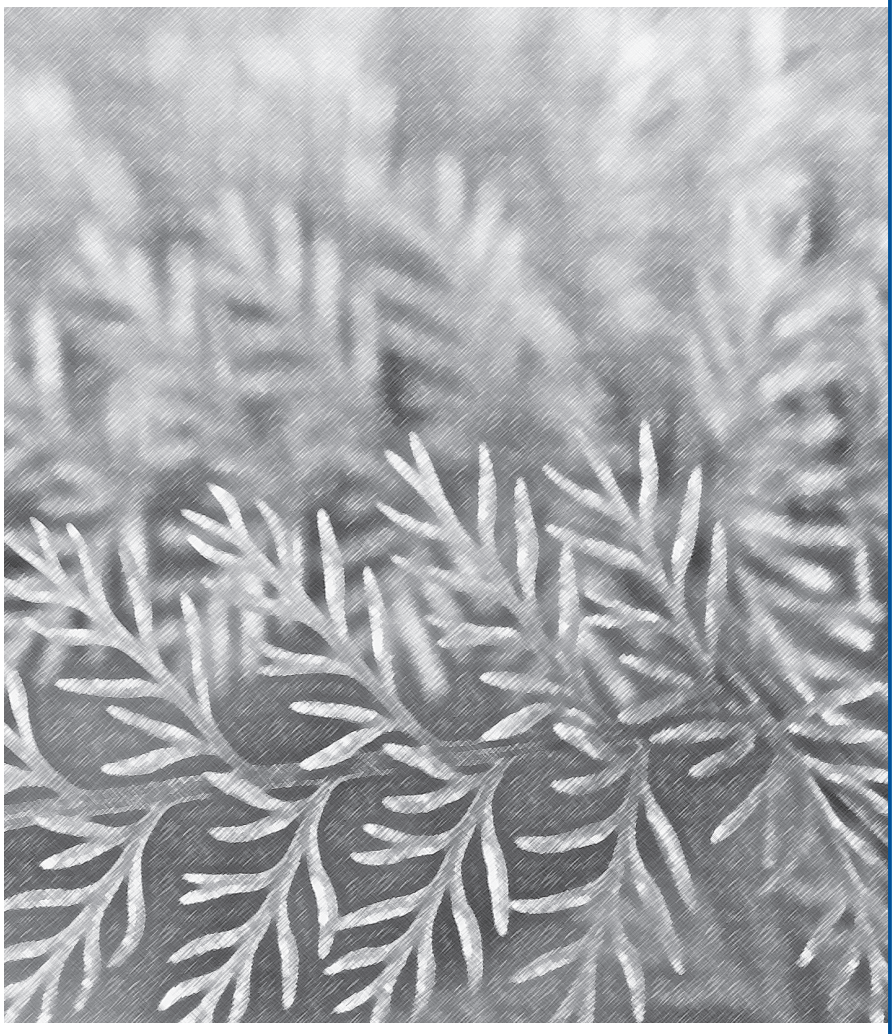

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Contents

EDITORIAL

Letter from the Incoming Editors-in-Chief

Sandra Sebre and Ģirts Dimdiņš

This issue of the *Baltic Journal of Psychology* marks a change in editorship from Solveiga Miezītis and Malgožata Raščevska, who are the founding editors of the journal, and who have been serving as Editors-in-Chief since the publication of the first journal volume in 2000 until this past year, to Ģirts Dimdiņš and Sandra Sebre. We would like to greatly thank Professor Solveiga Miezītis and Professor Malgožata Raščevska for their enthusiasm and courage in initiating and effectively developing the foundations for the journal and the yearly volumes which have been published since the initiation. At the time this was quite an audacious act because the number of psychology researchers and practitioners in Latvia was still very limited due to the sociohistorical context and that the first psychology training programs in Latvia were begun only in 1989.

As the newly appointed Editors-in-Chief we look forward to working together with you during the next few years in order to further advance the *Baltic Journal of Psychology* as a forum for psychologists, researchers and practitioners from all parts of the world. Already until now the journal has been pleased to publish papers by authors from the Baltic countries – Estonia, Latvia and Lithuania – as well as from our nearby neighbors – Sweden, Russia, Poland – but also from as far away as Israel, the United States, Canada, Germany, Netherlands, and Australia. We are also very pleased that the journal will continue to have an excellent and expanding international editorial board, and will follow the principles of a double-blind or "masked" review process in accordance with the standards of the American Psychological Association.

We are honored that this 2012 *Baltic Journal of Psychology* volume features several papers from researchers who presented at the 11th European Conference on Psychological Assessment, which was held in Riga in August of 2011, including as a pamphlet the keynote presentation by Professor Klaus Boehnke, and its rejoinder by Professor Fons van de Vijver, president of the European Association of Psychological Assessment, in lively discussion of "emic" and "etic" aspects in psychological research with implications for a possible quantitative "emic" cross-cultural psychology.

Our vision for the future of the *Baltic Journal of Psychology* includes a continual striving to provide a solid forum for presentation of high-quality theoretical and empirical scientific publications with an emphasis on research which has clear practical

implications. Not only in the Baltic countries, but in Europe and beyond, there still exists a significant gap between psychology research and society at large. As editors of the journal we hope to promote a focus on the practical implications of research within various branches of psychology – clinical, educational, cognitive, personality, social, organizational, traffic, etc. – so that psychologists practitioners, professionals from allied fields, and society at large can benefit from the results of this research. We aim to provide a forum for the publication of rigorous research within quantitative, qualitative, or mixed approaches. We welcome both cross-cultural research with an "etic" orientation, as well as culture-specific approaches from the "emic" research tradition. We also encourage submission of non-significant results based on careful (multiple) replications of previous findings, which may illustrate the robustness (or lack thereof) of the known psychological phenomena and mark the limitations of the existing knowledge base in psychology.

In closing, we wish to pay special tribute to two of our most highly respected colleagues, Professor Ārija Karpova (1941–2012) and Professor Viesturs Reņģe (1952–2012), who served on the *Baltic Journal of Psychology* editorial board during the period 2000–2012. We wish to thank the wonderful, accomplished international editorial board, to extend our thanks to the University of Latvia Press, in particular it's director Anna Šmite, and a special thanks to the journal's tremendous Editorial Assistant, Inese Muzikante.

Final Greetings from the Outgoing Editors-in-Chief

Solveiga Miezīte and Malgožata Raščevska

We had the pleasure to collaborate in founding the *Baltic Journal of Psychology* in 2000. With the generous help of our international and local editorial board members and the financial support of the University of Latvia we have been able to maintain regular yearly publication, with full articles published also electronically in the EBSCO data base and abstracts published in the American Psychological Association PsychExtra data base. The *Baltic Journal of Psychology* is the first peer-reviewed psychology journal in Latvia and the second in the Baltic countries. This has been a major step forward for the development of the discipline of psychology in Latvia, since psychology training in Latvia was begun as recently as 1989.

The aim of this journal was to stimulate quality research publication by senior and junior researchers, faculty members and doctoral students. The journal follows APA standards and invites reviews from internationally recognized experts in their particular areas of specialization. We are particularly indepted to those colleagues who formed the first editorial board: Juris Draguns (USA), Linas Bieliauskas (USA), Thomas Oakland (USA), Imants Barušs (Canada), Robert Burden (UK), Arthur Cropley, (Australia), Aldis Putniņš (Australia), Ilze Kalniņa (Canada), and Bernie Stein (Israel). We also wish to extend our gratitude to our colleagues from the University of Latvia – Sandra Sebre, Ivars Austers and Ģirts Dimdiņš, as well as our late colleagues Viesturs Reņģe and Ārija Karpova. And last but not least we extend our sincerest thanks to our supportive staff, executive secretary Vizma Zaķe, and more recently editorial assistant Inese Muzikante, who have made our job possible.

The *Baltic Journal of Psychology* covers a wide variety of research topics, and includes commentaries by practitioners about current issues in their areas of practice.

The journal has invited international collaboration and raised the visibility of psychology in the Baltic region. Over the years the University of Latvia has sponsored a number of international psychology conferences and the journal has published papers by presenters. The 17 issues published during the past 12 years include 76 reports of empirical studies, 19 theoretical reports and 10 reports with implications for practice by 198 authors. It has also kept the readership informed about professional standards of practice, and developments of psychology programs. As collaborators on this venture, we had the unique opportunity to form new contacts with colleagues from abroad and invite them join our ranks. We particularly wish to thank our friends and close collaborators Arthur Cropley, Thomas Oakland and Juris Draguns for their generosity and committment to support the quality of our journal.

Dear authors and readers, we hope that you enjoyed contributing to and reading our journal as much as we did in producing each issue. We count on your continued interest and support to maintain its publications. In closing, we wish to thank Sandra Sebre and Ģirts Dimdiņš for undertaking the joys and challenges in editing this journal and we wish them every success in leading the journal forward during the next decade.

Baltic Journal of Psychology, 2012, 13 (1, 2), 8–15

REPORTS FROM 11TH EUROPEAN CONFERENCE ON PSYCHOLOGICAL ASSESSMENT (ECPA 2011, Riga, Latvia)

On Comparing Apples and Oranges: Towards a Quantitative Emic Cross-Cultural Psychology A Pamphlet[1]

Klaus Boehnke
Jacobs University Bremen, Germany

Current-day state-of-the-art cross-cultural psychology rigorously attends to an equivalence requirement for the assessment of one and the same psychological construct in different cultures. The present opinionated piece suggests abandoning the requirement of using identically worded items in all cultures included in a cross-cultural comparison in favor of following a radically emic methodology in instrument development. An approach is suggested that develops items autonomously within the cultures included in a comparison, subsequently proves structural and measurement equivalence of covariance matrices obtained on the basis of items differently worded in different cultures, and finally validates the measurement by showing the equality of the relationship of the differentially measured latent construct under scrutiny with the same non-language-based variable in all cultures (as, for example, obtained through physiological measures).

Keywords: emic, etic, quantitative , comparative psychology, culture

The reigning credo of cross-cultural psychological assessment is that of perfect equivalence in measurement across cultures being an irrevocable requirement for valid comparisons (van de Vijver & Leung, 2011). 'Perfect,' in this context, is a colloquialism for the demand that there should be equivalence in the functional meaning of a construct (functional equivalence), the structure of a latent psychological construct (number and relational pattern of factors), the relative weight of items used to measure it (loading pattern), and the size and relationship pattern of measurement error. Such an approach commonly rules out that one and the same construct can be measured by different items in different cultures.

The present paper, which explicitly gives itself the subtitle "pamphlet," sets out to offer a few—hopefully—provocative ideas to pave the first steps on the way to a

[1] This paper elaborates the contents of a keynote address with the same topic that the author gave at the 11th European Conference on Psychological Assessment, 31 August – 3 September 2011 in Riga.

quantitative *emic* cross-cultural psychology, i.e., a culturally comparative psychology that defines its quantitative measures differentially from within the cultures included in a comparison.

Since its professional inception in the early 1970s[1] cross-cultural psychology, sometimes creatively, sometimes in fiercely antagonistic disputes, discussed the ways and means of how to compare psychological phenomena across cultures. Debates about the comparability of test scores across cultures are almost as old as psychometrics themselves; we just have to remember the concepts of a "culture-free" or a "culture-fair" test as introduced by Cattell (1949).

Within cross-cultural psychology but also in dissociation from it, discourse on the comparability of psychological phenomena across cultures was always marred by epistemological controversies if not even ideologies. When the most prominent arguments are subsequently sketched, single-source references are omitted. The reader is referred to the archive of the International Association for Cross-Cultural Psychology (IACCP; Berry & Lonner, 2006) as one source for detailed references. Other sources obviously are the various hand- and textbooks that have meanwhile appeared (e.g., Poortinga, 1977; Triandis, 1980; Berry, Poortinga, & Pandey, 1997; Matsumoto, 2001; Kitayama & Cohen, 2007).

The intention of the founders of cross-cultural psychology as a distinct subdiscipline of psychology was to check the validity of psychological research findings beyond Euro-American cultures (Jahoda, 1973). This credo quickly led to controversies under which circumstances one could (and even should) compare. The movement for a culturally informed psychology commenced as a rebellion against the psychological mainstream of the time, which almost exclusively studied white middle-class US students. Quickly, however, the new approach drew the criticism of being a particularly perfidious attempt to now study the whole world on the basis of North American theories. Allegations of an enlightened cultural imperialism were voiced at least in undertones of methodological debates, because the founders of cross-cultural psychology adhered to an epistemologically universalist top-down approach to psychological research: Contemporary psychological theories were typically chosen for a validity check outside of their cultural origination context. It was, however, the case some 40 years ago (and is to a high degree still today) that an overwhelming majority of—published—psychological theories originated from a Euro-American cultural context. Thus, quasi-automatically, a Euro-American understanding of psychological phenomena prevailed.

The world at that time was, however, still in the phase of de-colonialization, and among and beyond cross-culturalists, a movement of indigenization had a strong impact (Sinha, 1984). It pleaded for an attempt to always understand psychological phenomena from within a given culture; something that Europeans and North-Americans had done all along, without, of course, explicitly stating it.

The unequivocal plea for understanding psychological phenomena from within a given culture did then put new constraints on cross-cultural comparisons. How can one compare across cultures if the phenomena to be compared are defined from within

[1] The founding of the International Association for Cross-Cultural Psychology (IACCP) took place in Hong Kong in 1972, Jerome Bruner becoming its first president.

cultures? How can you even be sure that you have the same 'thing' under scrutiny? Epistemological extremists argued that you cannot, but at least among cross-culturalists there was a strong sentiment that comparison is important and possible. Controversies typically argued along epistemological and methodological camps: Qualitative vs. quantitative research, bottom-up vs. top-down strategies, the "*Verstehen*"-principle originating from German *Geisteswissenschaften* against a positivist explanation approach, an indigenous vs. a universalist scientific principle, were some of the camp-building buzzwords. The controversy between an indigenous and a universalist approach to answering the question what impact culture has on psychological phenomena and their interrelation has been discussed most lively under the heading 'emic' vs. 'etic,' a terminology borrowed from linguistics (Pike, 1954), and subsequently from anthropology (Goodenough, 1970).

All in all, it can safely be summarized that a deep rift between a qualitative, interpretive, indigenous, emic, and a quantitative, positivist, universalist, etic approach to a culturally informed comparative psychology has characterized the scene for several decades. Recently a mixed-methods approach has been proposed as a possible bridge across the rift (e.g., Roer-Strier & Kurman, 2009). Such an approach essentially advocates the credo of an 'okay let's do it both, and then let's try to make sense of what we find' by relating results from both approaches to each other ("triangulation").

The current pamphlet goes a step further by suggesting an actual 'marriage' of the two camps by suggesting a *quantitative* emic approach to a culturally informed comparative psychology.

In current, etically-minded cross-cultural psychology there seems to be a trend towards ever stricter requirements for equivalence (van de Vijver & Leung, 2011). A few decades ago it was enough to achieve a comparable factor structure of the items used to measure a construct in different cultures. Structural equivalence was enough as long as there was a consensus on functional equivalence, i.e., an acceptance that the construct was sufficiently similar across culture-specific nomological networks. Today, however, equality of loadings and of measurement errors and error correlations are often being required to allow a comparison across cultures. At the same time it has become customary to simultaneously secure functional and conceptual equivalence (that is, the requirement that concepts have the same meaning) by only utilizing equally worded items in all cultures. Thus, linguistically identical items that produce identical mathematical relations when used in studies in different cultures are seen as the silver bullet of etic cross-cultural psychology.

Identical mathematical relations, however, do not prove that identical psychological content is assessed: "The numbers don't know where they come from" (Lord, 1953: 751). If covariance matrices are identical across cultures, this solely suggests that numbers and their relationships are equal. It is utterly irrelevant for the math, what the numbers mean. There can certainly be structural equivalence, loading equivalence, and metric equivalence in matrices that are based on something different in each and every one of the matrices. Substantive equivalence cannot be generated by mathematical equivalence. In current-day etic quantitative cross-cultural psychology it is secured by accepting identically formulated items as proof.

When one takes into consideration that formulating identical items for cross-cultural research typically means that you have to include different languages (or in certain cases different variants of a language, like French from France and from Quebec, or British and American English), it quickly becomes evident that identity (of items) is discretionary, as linguists will quickly agree. Even words that would generally be accepted as equal across languages, like *Haus, house, maison, casa, дом,* 人家 (to just use the author's native language and the five official languages of the United Nations as the basis for an example) often if not always have culture-specific side connotations. Etic cross-cultural psychology takes the argumentational road to *prove* equivalence of meaning *by* equivalence of covariance matrices *and* vice versa.

The fact that mathematical equivalence says nothing about semantic equivalence opens the door for a culturally informed *quantitative emic comparative* psychology, so at least the thrust of the current pamphlet. With equal rigor as in quantitative *etic* cross-cultural psychology one could easily test mathematical equivalence for matrices that are based on instruments that differ in wording between cultures. Meaning equivalence would then obviously have to be secured in a way that differs from the approach that uses 'equal' items.

How might this be done? The first step would be that a culturally diverse research team finds a consensus on the psychological phenomenon they want to study. For such an agreement it is, of course, necessary in the first place that all cultures under scrutiny in a given research project are represented in the—ideally multilingual—research team. The team must then agree that for the phenomenon at stake there is functional equivalence, as would—in the material world—be the case for an umbrella and an anorak, but not, to resonate a bit further on the example, between an umbrella and a hairdryer or an anorak and a plastic bag (although both a hairdryer and plastic bag could be used to keep rain away from one's head).

Let's further assume that in a six-culture study [Belize, Liechtenstein, Monaco, Costa Rica, the Russian-speaking part of Moldova (so-called Transnistria), and Mandarin-speaking Singapore] the psychological phenomenon at stake is sadness (Traurigkeit, tristesse, tristeza, грусть, 忧伤). After the research topic has been agreed upon, the six research teams *autonomously* develop an item pool from out of their respective cultural contexts, i.e., emically. Let the ultimate aim be an 8-item instrument for every culture. In order to achieve this goal, every group develops, say, 40 items, and gives this 40-item instrument to a *random probability general population sample* of, say, N=400. In the view of the author a culturally informed quantitative emic comparative psychology must work with a random probability general population sample in its instrument development phase to secure that item selection is representative for that culture's population and not biased by the arbitrary selection of convenience samples in the cultures included in the cross-cultural study. Exactly that often creates substantial bias in etically-minded cross-cultural studies.

In Step 2, the 40-item instrument is checked within each culture for its uni-dimensionality and consistency. Items that do not load sufficiently on the unrotated first factor or exhibit too low an item-total correlation (r_{it}<.30) are 'thrown away.' Let's assume that some 60% of all items can be retained after this procedure in each and

every culture. In case different numbers of items 'survive' in different cultures, the lowest number of retained items determines the number of items for cross-cultural analyses. These, let's say, 25 items are then ordered according to their within-culture loadings (the estimation procedure must, of course, be identical in all six culture-specific analyses[1]) and get technical names, like MOOD1 to MOOD25. Subsequently the data files are pooled in a way that allows for multi-sample confirmatory factor analyses.[2] In the six-culture confirmatory factor analysis that is to follow, items with the same item number are constrained to have equal loadings across cultures. The error correlations of the items are fixed to zero. Subsequently, items for which these two constraints cannot be upheld are successively (one by one) discarded. Pragmatically this can be done by checking the modification indices offered, for example, by AMOS 20 (Arbuckle, 2011). In the initial step of the optimization procedure the item with the highest modification index is discarded. In case the highest modification index is found for an error correlation, that item of the two items with a high error correlation is discarded that has the higher loading-concerned modification index. After discarding one item, analyses are performed over again, successively, until—hopefully—a set of items remains for which loading equality across six cultures cannot be rejected. Equality constraints should be lifted (and items thus discarded), until a further lifting of an equality constraint/discarding of an item no longer significantly improves the overall model fit.

Readers should once again note that loadings are constrained to equality for items that have a different—emically derived—wording in every culture. Mathematical equivalence is secured independent of the fact that in all cultures non-identical items are used. In etically-minded cross-cultural studies, which work with identically worded items, arbitrariness enters the scene, when culture-specific differential connotations of items are disregarded as negligible due to mathematical equivalence. In the current emically-minded approach this problem does not exist, because meaning is generated exclusively within cultures. What is, however, possible, is a different meaning on the concept level. It could very well be the case that *tristesse* and *грусть* have a different meaning to begin with, in spite of the researcher consensus at the commencement of the study that these concepts are sufficiently similar.

How can one—above and beyond a researcher consensus—secure that concepts indeed have a sufficiently similar meaning across cultures, in spite of the fact that different items are used in every culture to assess them? Non-language-bound third variables seem to be an entry point here. In principle, any non-language-bound variable is a candidate for this validation strategy. If one is able to show that the emically derived latent construct under scrutiny is related to a third (preferably manifest) variable in an identical way in each and every culture, this, together with the mathematical equivalence that has already been corroborated, offers another argument for comparability of latent scores in spite of culture-specific assessment. One might think of variables like income,

[1] As it is later suggested to move forward to confirmatory factor analyses in cross-culturally comparative multi-sample analyses, where maximum likelihood estimation allows the most flexible handling of the suggested analyses, it is most convenient to also use maximum likelihood estimation early on for the exploratory within-culture factor analyses.

[2] Ideally only full datasets (no missings) should be included in the pooled file.

years of schooling, or hours of watching TV per day. These examples obviously are no real good candidates for validating meaning equivalence for culture-specific sadness scales, but readers with more creative fantasy than the author may be able to think of better candidates.

Just as an aside: Those readers who were brought up in traditional psychometrics and those who work closely together with practitioners will be familiar with the fact that many psychological tests have parallel, sometimes several parallel forms, where everyone accepts that results are comparable although parallel forms are essentially nothing else than two sets of differently formulated items that are agreed upon as measuring the same concept. In aptitude testing (take the SAT) it is even state-of-the-art that tests are developed over again for every testing season. It is nevertheless postulated that the results of the tests can be compared between people who took the tests in differing forms in different years. What else is this than suggesting that different items can validly measure the same construct with different people and that their scores can be compared?

Well, skeptics will respond by saying, yes, maybe, but for parallel test forms there usually have been extensive pretests in which individuals were given the items of both forms and—for sound parallel forms—it was established beforehand that the new items and the old items share equal means and equal standard deviations. Well, here the author would once again respond by saying, 'the numbers don't know where they come from.' Certainly, one can mathematically ascertain that means and standard deviations are the same for two given sets of items and also that their covariances match each other, but that says nothing about the equality or inequality of the psychological substance per se. The concept of parallel test forms can nevertheless serve as a godfather of a quantitative emic cross-cultural psychology. If I can develop parallel test forms that are accepted for the selection of people to top US universities, why can most cross-cultural psychologists not accept a comparison of people across cultures, which uses different items in the different cultures?

This critical question is even more so in place as speaking of equivalent or even identical items in cross-cultural research is a chimera once you do your cross-cultural study in more than one language community (as in the example above). Translation makes items different per definition. Nevertheless, many cross-culturalists uphold the conviction that equivalence can be proven by showing the identity of certain matrices, i.e., assemblies of numbers, but only if the measures they use, the items, are equivalently worded. Developers of parallel test forms do not formulate this demand. They just require the same means and standard deviations of their—diverging—items, sometimes they even explicitly avoid similar formulations in order to avoid memory traces in repeated measurement designs, like when I take an SAT in Year 1 and another one a year later. What test developers look for to start with is equal face validity of an old and a new item, and that's it.

Maybe the queen's way (to avoid using the militaristic silver bullet metaphor once more) to escaping allegations of inequivalence can be found on the terrain of physiological or neurophysiological measures. If one can show that an emically-derived measure of sadness is identically related to physiological measures (like hormone levels,

muscle contractions, skin resistance, EEG or MEG forms, or yet more sophisticated neurophysiological measures), who could then really continue doubting that the same 'thing' can be measured via differently worded items in all cultures under scrutiny?

Concludingly (and humorously), the necessity to allow for emically-derived instruments for a quantitative culturally informed comparative psychology can nicely be illustrated by referring readers back to the title of this pamphlet. Let's assume the author wanted to assess the convincingness of his arguments via an item like "I am in favor of comparing apples and oranges in cross-cultural psychology" on a so-and-so-many-point Likert scale. But then let's assume that he wanted to ask every reader in his or her own native tongue, Latvians in Latvian, Russians in Russian, Spaniards in Spanish, and Germans in German, and so on. For Russian speakers one might be able to stick with comparing яблоки с апельсинами, but less fashionable people may rather recommend comparing теплоё (tyeployo) с мягким (myakhkim). Latvians may agree to or refuse to compare suņus ar kaķiem (dogs and cats). In the author's native tongue the item might read "*Ich bin für den Vergleich von Äpfeln und Orangen in der kulturvergleichenden Psychologie*." Hold it, the Germans will say. We do not compare apples and oranges, there were no oranges in the olden times in Germany, so comparing something with them would not make sense; we compare apples and pears, *Äpfel* und *Birnen*. Now, does one change *Orangen* (oranges) to *Birnen* (pears) in the translation? Or is equivalence gone when I change the fruit? Most readers will respond by saying, equivalence is equivalence, not identity, so if there is an idiom that is *deemed* equivalent by bilinguals, then use it in its established form: Spaniards compare '*la noche y el día*.' Heard the 'deemed' sneak into the argument? Equivalence is assumed when it is *deemed* given by bilinguals…. At the end, equivalence is always a matter of a subjective decision of the researcher. What he or she deems equivalent is accepted as being such! It is not the identity of two matrices of numbers that proves it.

Allow the author to ride his hobby horse yet a bit longer. What would readers have said if he had translated the apples and oranges idiom—similar to the Russian example that was given—as "*Ich bin für den Vergleich von Äpfeln und Apfelsinen in der kulturvergleichenden Psychologie*?" *Apfelsinen* (Chinese apples) is a perfect synonym for oranges in German, but besides not being an established idiom in German, would the use of a phrase that suggests that some kind of apples should or should not be compared with another kind, namely Chinese apples, change the content of the original English by semantically bringing the two to-be-compared types of fruit much closer together in German then they were in the original English formulation, and wouldn't that maybe influence the ratings?

Well, there are many quirky questions we can ask on this terrain. What this pamphlet advocates is to give up the demand of equivalent items that originates from etic approaches to cross-cultural psychology altogether and change paradigms to an emic quantitative cross-culturally comparative psychology.

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Baltic Journal of Psychology, 2012, 13 (1, 2), 16–18

Should We Develop a Quantitative Emic Cross-Cultural Psychology?

Fons J. R. Van de Vijver

Tilburg University, Tilburg, The Netherlands,
North-West University, Potchefstroom, South Africa, and
University of Queensland, Brisbane, Australia

Klaus Boehnke has a clear message for his colleagues in cross-cultural psychology who spend a lot of energy in testing for invariance and in trying to make measures as free of bias as possible: You can relax, be less fussy about the measurement procedures that you use, and you can adopt an emic perspective and still compare mean scores across cultures. If we develop culture-specific instruments that measure a single construct in each culture, we can be confident that if we have an instrument that is sufficiently large, we will obtain instruments with invariant factor loadings (metric equivalence). Although the comparability of mean scores is not mentioned in the manuscript, I think that the author would readily extend the comparability to mean scores (scalar equivalents). The obvious question which arises is whether cross-cultural psychologists should become less neurotic about comparability of instruments or whether the author is bit too relaxed about issues in cross-cultural assessment.

The interesting aspect of the paper is that two, typically considered incompatible approaches to cross-cultural assessment are combined. On the one hand, there is the emic, culture-specific perspective in which the close link between underlying construct and measurement procedure is emphasized Employing a culture-specific approach is often taken to preclude any cross-cultural comparison of constructs or scores. Persons interested in this perspective are often indeed not interested in cross-cultural comparisons at all. If one is interested in depression in a very specific cultural complex, it may be less important to deal with what we know about depression in the Western world. On the other hand, there is the etic, comparative approach that tries to maximize the comparability scores across cultures. It is not so long ago that proponents of the two approaches were intellectual enemies who would not speak to each other and would not quote each other's work. Against this backdrop, any attempt to combine both worlds has to be viewed with sympathy. Boehnke's approach is an optimistic message that attempts to cross borders (as it behooves a good cross-cultural psychologist).

The article is very well written and thought-provoking, as a good pamphlet should be. It is not my intention here to evaluate each and every aspect of the reasoning of the manuscript but look at the reasoning behind the manuscript from a more distant perspective. I will first summarize the main strengths of the reasoning and then indicate the problems I see. Finally, I draw some conclusions.

What is attractive about Boehnke's reasoning? The obvious first advantage is that we can approach equivalence from a broader, less restrictive perspective. His argument is that we just need to ensure that an instrument has a good representation of a construct in a certain culture. Well, we surely have enough expertise in cross-cultural assessment not to be frightened by that assumption. Assuming that the instruments have good psychometric properties in all cultures, we can compare constructs and scores across cultures. The charm of his approach is that he moves the problem of equivalence to issues of assessment within a culture. Furthermore, his approach implies a great deal of flexibility. Finally, the approach has the advantage that the focus moves beyond the uncritical applications of usually Western instruments in contexts where they may have a dubious validity. The reasoning is in line with modern thinking about test development and test adaptations (e.g., Hambleton, Merenda, & Spielberger, 2005). When adapting tests there is more appreciation of the potential problems of translated instruments; if an item is suspected not to work adequately in a new cultural context, there is no attempt to maintain the item at every price to maintain equivalence but to adapt the item so as to ensure an adequate cultural coverage in the new instrument.

However, the approach that is proposed by Boehnke also has a serious drawback. My main concern is that Boehnke argues that a demonstration of mathematical equivalence does not say anything about semantic equivalence. I disagree. If we test similarity of multivariate structures across cultures, such as testing whether we find the same factors across cultures, we use the transition from words to numbers, from responses to multivariate structures, to enable us to test similarity at a (quantitative) level we would never be able to obtain when we use qualitative tools. Finding similarity of multivariate structures, obtained in different cultures, is informative about the similarity of the underlying psychological realities. If we take the idea seriously that quantitative responses are a function, if even an imperfect one, of an underlying psychological reality, we should derive consequences from (not) finding mathematical equivalence. The transition from the semantic to the mathematical domain in equivalence testing is crucial in my view. It strikes me that Boehnke also takes the relationship seriously as, after all, he applies equivalence tests to his emically derived instruments.

The question is whether in his approach the various forms of equivalence can be established that have been defined in the literature (e.g., construct, metric, and scalar equivalence; Van de Vijver & Leung, 1997). He takes the best set of items to measure a construct in a number of cultures, ranks them by factor loading, and this is used as the input for the analysis. The differences in ranks across cultures can be huge. A list of symptoms of sadness in one culture may show a random permutation or even the complete reverse order in another culture; furthermore, there is a serious chance that each culture will have some unique items. Boehnke's advice is to just rank order these and analyze equivalence. The main problem with his approach is the inability to establish inequivalence at construct and item level (Van de Vijver & Leung, 1997): a content analysis of the items may well reveal that the psychological meaning of the concept or specific items differs across cultures. Now, such a finding should not bother us; quite on the contrary, cross-cultural psychology owes its existence to differences. However, if sadness in Culture A is a partly different concept than in Culture B, we should refrain from making any cross-cultural comparison in mean scores, as Boehnke

suggests. Rather, we should identify the items that work and the items that do not work in order to identify both the similarities and differences of the concept in the different cultures. Such information cannot be obtained by just ranking the factor loadings of items and compare these across cultures, but by a careful analysis of which factor loadings are identical and which ones are different. Now, this is exactly what is done in conventional equivalence analyses.

What can we conclude? The ideas by Boehnke are charming and help to focus our thinking on cross-cultural assessment. The question of whether an instrument can be used in the same way in different cultures is replaced by the question of how we can best measure the construct in a culture. I agree with Boehnke that the conventional approach with its emphasis on identical measures in all measures has become a straightjacket that can stifle progress. However, I am not convinced that more room for emic measures would imply that we should not bother which items work better (or worse) in specific cultures. It could indeed be well the case that in Boehnke's emic approach interesting cross-cultural differences (in factor loadings or types of indicators) are swept under the carpet. I think that even in an emic framework, the conventional procedures for equivalence testing are adequate and needed (Cheung, Van de Vijver, & Leong, 2011). In conclusion, I am very sympathetic to the proposal to develop an emic quantitative cross-cultural psychology, but I do not think that the procedures outlined by Boehnke would constitute an adequate methodological underpinning of this approach.

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The Meaning of Social Signals: The Psychosemantic Approach

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This paper presents the application of meaning theory and assessment to the issue of the perception and meaning construction of stimuli assumed to be social signals of interpersonal attitudes. In the first part the major constructs of meaning theory (Kreitler & Kreitler, 1990) are presented briefly: meaning unit, referent, meaning value, meaning variables and especially meaning dimensions representing content categories. Input identification is assumed to be one of the major functions of meaning. The major three phases of input identification are described on the basis of previous studies. In the second part of the paper a preliminary study is presented, whose objective was to explore whether stimuli with the characteristics of social signals (are assigned meanings in a particular manner and of specific kinds. The participants were 32 students. The procedure consisted in presenting to the subjects stimuli – some corresponding to the characteristics of social signals and some matched only structurally – in a microgenetic setup. The task of the subjects was to identify the stimuli as fast as possible and report their perceptions in each of 8 consecutively graded exposures. The meaning construction in the three phases turned out to be different for the stimuli of the social signals kind. They were identified fast and the meanings assigned to them tended to refer to their cognitions and feelings, communicating interpersonally-relevant attitudes.

Keywords: social signals processing, meaning system, input identification, social attitudes

Introduction

Social signals are defined as "the expression of one's attitude towards a social situation and interplay…manifested through …non-verbal behavioural cues including facial expressions, body postures and gestures, and vocal outbursts" (Vinciarelli, Pantic, & Bourlard, 2009, p. 1743). This definition emphasizes two aspects of social signals: the cues and the attitudes towards social situations. The cues may be regarded as the carriers of meanings, and the attitudes as the meanings expressed or communicated by these cues. This kind of reformulation of social signals is grounded in the psychosemantic approach which studies the nature, function and processing of meaning.

Theoretically the social dimension has often been viewed as an integral aspect of semantics, as is evident already in Saussure's (1916/1983) vision of semiotics as "a science which studies the role of signs as a part of social life". Social semiotics, emphasizing the role of the social dimension in semantics, has been promoted mainly by thinkers such as Halliday (1978), different members of the Sydney school (e.g., Hodge & Kress, 1988), and by those who focused on defining the nature and function of social codes as the

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basis for social interactions and cultural character (e.g., Eco, 1976; Leach, 1982; Hall, 1973/1980).

The salience of the social dimension in psychosemantics in general raises the question about the specificity of social signals. The assumption that the social aspect is involved in meanings of all or most kinds of cues renders it necessary to explore the particular psychosemantic nature of social signals. In the framework of the newly emerging discipline of social signals processing, social signals are defined as a particular kind of input that delivers particular kinds of meanings. The inputs are conceived as non-verbal behavioral cues produced by the human face and body, including physical appearance, gestures, facial expressions and gaze behavior (Vinciarelli, Pantic, & Bourlard, 2009), while the meanings are conceived as socially-relevant "attitudes" toward a social situation, including agreement, politeness, empathy, aggressiveness, interest, determination, friendliness, or boredom (Pentland, 2007). While the inputs and the resulting meanings have been specified, the processes which link the inputs to the meanings still remain unspecified. Characterizing the processes of meaning assignment that underlie social signals processing would provide deeper insight into the involved processes, and more venues for applications of the technologically-implemented kind and others. The exploration of the meaning assignment processes of social signals will be carried out in the framework of meaning theory, applying its theoretical constructs and assessment methodologies. The next section presents a brief description of this approach, describing the nature of meaning, its functions and especially the processes of input identification, which will be applied for exploring social signal processing.

Meaning: The Theory and the System

Meaning is a procedure for using cognitive contents for defining, expressing and communicating meanings for a variety of purposes, e.g., identifying inputs, problem solving, comprehension, or communication. Meaning consists of meaning units, which include two components: 'the referent' which is the input, the stimulus, or the subject to which meaning is assigned; and 'the meaning value' which is the cognitive contents designed to express or communicate the meaning of the referent. The following are three examples of meaning units: "table – serves for eating", "bread – is on the table", "milk – is produced by cows". In these meaning units, 'table', 'bread', and 'milk' are the referents and 'serves for eating', 'is on the table' and 'is produced by cows' are the meaning values. Each meaning unit may be characterized in terms of meaning variables of the five following classes: meaning dimensions – which characterize the contents of the meaning values (e.g., locational qualities, material, sensory qualities, emotions); types of relation – which characterize the immediacy of the relation between the referent and the meaning value (e.g., attributive, exemplifying-illustrative, metaphoric-symbolic); forms of relation – which characterize the logical-formal properties of the relation between the referent and the meaning value (e.g., positive, conjunctive, partial); shifts of referent – which characterize the relations of the present referent to the initial input and previous referents (e.g., identical, partial, opposite); and forms of expression – which characterize the media of expression of the referent and/or the meaning value (e.g., verbal, graphic, motional).

Each of the five sets of meaning variables is complete in itself and independent of the other sets. Thus, characterizing a meaning unit involves using one variable from each set. For example, when the input is "car" and the individual's response is "The car has a motor", the meaning unit is "Car – has a motor" and this meaning unit is coded in the following manner: Meaning dimension: Range of inclusion, Type of relation: attributive, Form of relation: Declarative positive, Shift of referent: Identical to input, and Form of expression: Verbal. The meaning system consists of the whole set of the meaning variables. Notably, the presented meaning system includes the most comprehensive set of variables used for communicating and describing meaning (e.g., Fodor, 1987; Lakoff & Johnson, 1980; Osgood et al., 1957). The fact that it includes all the variables of other systems although it was constructed not by the eclectic method but on the basis of an autonomous innovative theoretical approach may serve as support for the validity of the system. The coding of the meaning units is done by means of a computer program (Kreitler, 2010b)[1].

The description of the components of meaning indicates that it is a system, that it is complex, and that its elements are defined in terms of other elements of the system (namely, it is self-embedded and regressive). These three characteristics reflect the static or structural aspects of the system. They are complemented by three further properties that describe the dynamic aspects of meaning: it is a developing system in the ontogenetic sense; it is a selective system dependent in its structure and functioning on properties of the individual and the input; and it is a dynamic system, whose special characteristics become manifest when it is activated for meaning assignment.

Each individual disposes over a certain selected part of the meaning system which represents the specific tendencies of that individual to apply the meaning system in information processing. Thus, each individual tends to use specific meaning variables with higher frequency and other meaning variables with medium or low frequency. The frequencies with which the individual tends to use each meaning variable are assessed by means of The Meaning Test and constitute the individual's meaning profile.

The major and most essential function of meaning is input identification (Kreitler & Kreitler, 1984; Kreitler, in press-b). This function is implemented by providing the contents and processes enabling meaning assignment to inputs. Input identification ranges all the way from limited identification in terms of a stimulus for a particular action to highly complex meaning elaborations necessary for acts involving cognitive, emotional, physiological and behavioral components (Kreitler & Kreitler, 1985).

A further function of the meaning system is to provide the cognitive contents and processes necessary for carrying out different cognitive acts. Studies showed that each meaning variable represents a specific set of contents and processes. For example, the meaning dimension Locational Qualities represents the set of contents denoting location (e.g., special, geographic) and the processes involved in dealing cognitively with locations (e.g., identifying, specifying, recalling, transforming locations). Further studies showed that each type of cognitive act corresponds to a specific pattern of meaning variables that provide a description of the contents and processes involved in its enactment. For example, meaning variables involved in planning include the

[1] Access to the program may be obtained by writing a request to the author <krit@netvision.net.il>

Table 1. **Major Variables of the Meaning System: The Meaning Variables**

MEANING DIMENSIONS		***FORMS OF RELATION***	
Dim. 1	Contextual Allocation	FR 1	Propositional (1a: Positive; 1b: Negative)
Dim. 2	Range of Inclusion (2a: Sub-classes; 2b: Parts)	FR 2	Partial (2a: Positive; 2b: Negative)
Dim. 3	Function, Purpose & Role	FR 3	Universal (3a: Positive; 3b: Negative)
Dim. 4	Actions & Potentialities for Actions (4a: by referent; 4b: to referent)	FR 4	Conjunctive (4a: Positive; 4b: Negative)
Dim. 5	Manner of Occurrence & Operation	FR 5	Disjunctive (5a: Positive; 5b: Negative)
Dim. 6	Antecedents & Causes	FR 6	Normative (6a: Positive; 6b: Negative)
Dim. 7	Consequences & Results	FR 7	Questioning (7a: Positive; 7b: Negative)
Dim. 8	Domain of Application (8a: as subject; 8b: as object)	FR 8	Desired, wished (8a: Positive; 8b: Negative)
Dim. 9	Material	***SHIFTS IN REFERENT***[b]	
Dim. 10	Structure	SR 1	Identical
Dim. 11	State & Possible change in it	SR 2	Opposite
Dim. 12	Weight & Mass	SR 3	Partial
Dim. 13	Size & Dimensionality	SR 4	Modified by addition
Dim. 14	Quantity & Mass	SR 5	Previous meaning value
Dim. 15	Locational Qualities	SR 6	Association
Dim. 16	Temporal Qualities	SR 7	Unrelated
Dim. 17	Possessions (17a) & Belongingness (17b)	SR 8	Verbal label
Dim. 18	Development	SR 9	Grammatical variation
Dim. 19	Sensory Qualities[c] (19a: of referent; 19b: by referent)	SR 10	Previous meaning values combined
Dim. 20	Feelings & Emotions (20a: evoked by referent; 20b: felt by referent)	SR 11	Superordinate
Dim. 21	Judgments & Evaluations (21a: about referent; 21b: by referent)	SR 12	Synonym (12a: in original language; 12b: translated in another language; 12c: label in another medium; 12d: a different formulation for the same referent on the same level)
Dim. 22	Cognitive Qualities (22a: evoked by referent; 22b: of referent)	SR 13	Replacement by implicit meaning value
TYPES OF RELATION[a]		***FORMS OF EXPRESSION***	
TR 1	Attributive (1a: Qualities to substance; 1b: Actions to agent)	FE 1	Verbal (1a: Actual enactment; 1b: Verbally described; 1c: Using available materials)
TR 2	Comparative (2a: Similarity; 2b: Difference; 2c: Complementariness; 2d: Relationality	FE 2	Graphic (2a: Actual enactment; 2b: Verbally described; 2c: Using available materials)
TR 3	Exemplifying-Illustrative (3a: Exemplifying instance; 3b: Exemplifying situation; 3c: Exemplifying scene)	FE 3	Motoric (3a: Actual enactment; 3b: Verbally described; 3c: Using available materials)
TR 4	Metaphoric-Symbolic (4a: Interpretation; 4b: Metaphor; 4c: Symbol)	FE4	Sounds & Tones (4a: Actual enactment; 4b: Verbally described; 4c: Using available materials)
		FE5	Denotative (5a: Actual enactment; 5b: Verbally described; 5c: Using available materials)

[a] Modes of meaning: Lexical mode: TR1+TR2; Personal mode: TR3+TR4

[b] Close SR: 1+3+9+12 Medium SR: 2+4+5+6+10+11 Distant SR: 7+8+13

[c] This meaning dimension includes a listing of subcategories of the different senses/sensations: [for special purposes they may also be grouped into "external sensations" and "internal sensations"] e.g., color, form, taste, sound, smell, pain, humidity and various internal sensations.

meaning dimensions structure, temporal qualities, and causes and antecedents (Kreitler & Kreitler, 1986a, 1987a); meaning variables involved in creativity include the illustrative-exemplifying and metaphoric-symbolic types of relations (Casakin & Kreiter, 2005; Lahav, 1982; Kreitler & Kreitler, 1990b, Kreitler, in press-a).

If the individual's meaning profile includes a sufficient proportion of the meaning variables included in the pattern corresponding to the particular cognitive act, that individual will be able to perform well the particular cognitive act (Kreitler & Kreitler, 1989, 1990a, 1994; Kreitler & Nussbaum, 1998). In some cases the experimentally or otherwise induced salience of specific meaning variables in the individual's meaning system is manifested in a broad range of cognitive effects (Kreitler, 1999; Kreitler, Kreitler & Wanounou, 1987-1988).

A third function of the meaning system is manifested in the domain of personality. A body of research has shown that each of over 200 personality traits corresponds to a specific pattern of meaning variables. As in regard to cognitive acts, the pattern of meaning variables may be considered as providing a description of the contents and processes involved in the enactment of the specific trait. For example, the meaning variables in the pattern corresponding to extraversion include high salience of the meaning dimensions of action, sensory qualities, temporal qualities and belongingness of objects, as well as low salience of the meaning dimensions of internal sensations and cognitive qualities (Kreitler & Kreitler, 1990a, 1997). If the individual's meaning profile contains a sufficient proportion of the meaning variables included in the pattern corresponding to the particular personality trait, it is likely that the individual scores high on that personality trait.

The same holds in regard to further tendencies in the domain of personality, such as personality dispositions, value orientations, defense mechanisms, the self, and emotions (Kreitler, 2003, 2010a, 2011; Kreitler & Kreitler, 1987b, 1993a).

In sum, the described functions of the meaning system indicate that the meaning system provides the understructure – that is, the raw materials in terms of contents and processes – for input identification, cognitive functioning, personality tendencies and emotions. All four functions depend on meaning assignment and reflect the central role of meaning for and within cognition. This has given rise to the psychosemantic conceptualization of cognition as a meaning-processing and meaning-processed system.

Meaning in the Service of Input Identification

As noted, meaning fulfills a major role in input identification and hence also in social signal processing. Assigning meaning to inputs is a process rather than an act. The process of input identification can be described in terms of three main phases, delineated on the basis of several studies in which different kinds of visual inputs were presented for identification (Kreitler & Kreitler, 1984, 1985, 1986c; Kreitler, in press-b). The basic paradigm of the studies was microgenesis, whereby the input is presented in a series of gradually improving perceptual conditions (in terms of time of exposure, focus and illumination) and the respondent is requested to identify the input as soon and as fast as possible. In general, in the first phase of input identification only a few input features are perceived, namely, the sensory quality of brightness (e.g., dark, bright,

gray), locational characteristics (e.g., in the center, to the right, down), and quantity (e.g., two parts). Notably, meaning values of this kind are perceived by most individuals in the first phase of exposure to visual stimuli, regardless of their personal tendencies or salience of meaning variables in their personal meaning profiles.

The meaning values perceived in the initial phase are characteristically used for assigning a label to the input. In the second phase, following the determination of the label, further input features are detected, in line with whether the label indicated an inanimate object or a living creature (e.g., human, animal). In the former case, attention focuses on structure, size and the further sensory qualities of form and color. In the latter case, when the label indicates an organism, attention focuses on perceiving actions and the state of the involved figures. In both cases the obtained information is used for an elaboration of the percepts. The amplification of the perceived information enables confirmation or disconfirmation of the referent as well as a consolidation and expansion of its meaning. In the third phase, the meaning of the input is further elaborated in line with the available information and the meaning assignment tendencies characteristic of the individual.

Thus, the first phase of input identification is input-driven, the second is label-driven and the third is meaning-driven (Kreitler & Kreitler, 1984). The criterion for the termination of the first phase is the attainment of a referent that may be general or indeterminate but still answers the implicit question "what is it". The criterion for the termination of the second phase is the attainment of a meaning unit that includes a relatively specific referent with some characterization that refers mostly to its structure or size or form and color (in the case of an inanimate object) or to its state or action (in the case of an animate object). The criterion for the termination of the third phase is less determinate because it depends to a large extent on the context in which input identification takes place. If the context enables or promotes meaning elaboration, as for example exposure to art, an academic discussion, a symposium or a panel, the third phase may extend as much as warranted by restrictions of time, place, and personal interest. If however the context is action-oriented, the third phase may terminate as soon as action is possible in view of the identified input, which under certain conditions (e.g., stress or danger) may occur already right away after the second phase.

Several complementary trends function in interaction in the processes underlying input identification. One set of trends consists of the homogeneity across individuals versus individual tendencies. The homogeneity is manifested in the focusing on specific meaning values in the first and second phases whereas the individual preferences are manifested to advantage in the third phase of input identification. Another set of trends consists in the interplay between perceiving and conceiving. While perception of meaning values constitutes the core of information gathering in all three phases, conceiving underlies the major process of referent construction, which is based on hypothesis stating and testing. The percepts and the referent undergo different processes. The percepts are subject to information gathering and accumulation while the referent is subject to particularization or specification in the course of confirmation. The perceptual accumulation of information serves the specification of referents

and the confirmation of the hypotheses that underlie their emergence. A third set of trends consists in the interplay between that which is presented in the given situation and is extracted out of it by the perceiver and that which is imported by the perceiver into the situation from one's own experience, personal as well as social and cultural. The former consists in perceived features of the objects or figures, while the latter is particularly evident in the form of the conceived referents and the labels by which they are represented. These tendencies are sometimes called bottom-up and top-down, respectively.

Further findings about input identification were obtained by studying specific kinds of inputs. One set of inputs studied in depth were emotions, specifically fear and anger (Kreitler, 2003, 2011). In both cases different aspects or kinds of emotional reactions were triggered by meanings assigned to the emotion-relevant inputs in the different phases. Thus, anger, for example, may occur in the different phases of elaborating the meaning of the input. It may show up already in the input-driven first phase of meaning elaboration, in the form of a sudden surge of anger or rage or some form of annoyance or irritation (Berkowitz, 1999). These reactions would appear automatically as manifestations of the identified input. They function, in fact, as meaning values of the input, and may therefore be considered as instances of "meaning action" which represents unconditioned or conditioned responses released by the mere identification of the input.

In the label-driven second phase of meaning elaboration, anger may occur in the form of a regular feeling of anger. This feeling depends on the elaborated meaning of the label and includes the emotional (experiential), physiological and cognitive components of anger. These responses are much more personal and flexible than the rage responses since they depend on a more elaborate meaning generation.

In the meaning-driven third phase of meaning elaboration, the meanings of the identified input, of one's own response and of the whole situation are taken into consideration in order to determine whether a behavioral act, such as verbal or physical aggression will ensue or not. The elaboration of meaning in this stage is focused, as it were, on questions, such as "Do I have to respond?", "Is action necessary?", "Am I involved in a manner that calls for a behavior on my part?" "Are my norms and goals or self image involved in any way?" Passing from the experiential to the behavioral level of responding requires the involvement of the systems of motivation and action (Kreitler, 2004).

Another set of inputs that shed light on the processes of input identification were verbal stimuli (Kreitler & Kreitler, 1984, 1985, 1993b). The participants were requested to identify and communicate the meanings of words, phrases and sentences, singly or in various combinations. These studies highlighted the special role of the context in the construction of meaning. In one study the initially provided information that the inputs were verbal stimuli led the participants in the experiments to focus their attention on the search of linguistic stimuli. Thus, the first phase of input identification was greatly shortened almost to the point of being completely skipped over. Another study showed that the meaning of a word embedded in a phrase depended largely on the meaning of the additional word in the phrase whereby the goal was to attain a meaning based on

both words together and matching both. For example, the word "square" standing alone denotes "form", but in the phrase "square one" it denotes "beginning".

Finally, working with visual inputs highlights the special role of label meaning in the construction of meaning. When asked to communicate the meaning of a photograph or picture the participants need first to determine the referents in the visual display. These may refer to parts of the picture, such as a figure or an object, or to the whole of it. The referents are stated by the participants verbally. Words tend to function as labels which means that as soon as the participants identified a referent by a word, they focused exclusively on the label and communicated the meaning of that label, regardless of the particular features of that referent in the picture or photo. For example, if there is in the picture a referent in the form of a flying bird, most of the participants would express the meaning of 'bird' as such without referring to the particular feature that it is flying or has blue stripes on it wings.

Social signal processing

This section presents the preliminary findings of a study of social signal processing.

Objective of the study. The study was designed to shed light on characteristic processes involved in the meaning construction process in regard to social signals. The expectation was that the meaning processes involved in input identification of stimuli of the social signals kind would differ from those involved in input identification of stimuli of other kinds.

Method

Participants. The participants were 32 undergraduate psychology students of both genders (age range 22 to 27 years; 15 men and 17 women). They participated in the study in partial fulfillment of their obligations in the psychology . department. In all cases psychology was their major subject of studies.

Stimuli. Two sets of stimuli were used (Table 2). One set consisted of 10 stimuli representing various kinds of social signals (SoS), whereas the other set consisted of 10 stimuli including the major components of the stimuli in the first set but without the human characteristic (Non-SoS). For example, if in the SoS series there were two silhouettes of human beings, in the Non-Sos set there were two sticks of the same height and width that were not made to look like human beings in any way. The two sets of stimuli were maximally matched to each other except for the human characteristic that appeared only in the SoS series. The characteristics represented in the SoS series were symmetric or non-symmetric congruence, emotional expression, distance, stretching hands forward towards each other, and seating proximity and arrangement. Each of these five characteristics was represented by two values (e.g., distance was represented by "close" and "far")[1].

[1] The original stimuli used in the study may be obtained from the author by writing a request to the following address: krit@netvision.net.il

Table 2. **Description of the stimuli used in the preliminary study of social signals processing**[a, c]

	The characteristic feature	***Social signals (SoS)***	***Non-social signals (Non-SoS)***	***Expected meaning of social signals***
1	Symmetric congruence	Two human silhouettes	Two sticks placed symmetrically	High psychological involvement
2	Non-symmetric congruence	Two human silhouettes	Two sticks placed asymmetrically	Low psychological involvement
3	Emotional expression: surprise	Face expressing surprise[b]	Non-face round object with two round holes in the location of eyes and a line in the mouth region	Surprise
4	Emotional expression: happiness	Face expressing happiness[b]	Non-face round object with two lines in the location of eyes and an opening in the mouth region	Happiness
5	Distance: close	Two human silhouettes close to each other (in the range of intimate zone)	Two sticks placed close to each other	Intimacy, belonging together
6	Distance: far	Two human silhouettes removed/far from each other (in the range of public zone)	Two sticks placed far from each other	Disconnected, drawn apart
7	Stretching open hands forward towards each other	Two human silhouettes facing each other with hands stretched forward with loosely open hands	Two sticks with horizontal lines in front, with small lines at the ends, placed close to each other	Greeting, desire for contact, acceptance
8	Stretching closed hands forward towards each other	Two human silhouettes facing each other with hands stretched forward with clenched fists	Two sticks with horizontal lines in front, with small balls at the ends, placed close to each other	Attacking, desire to hit, rejection, threat
9	Seating proximity and arrangement: close	Four human silhouettes, two of which are a little larger and are placed close to each other, in adjoining positions	Four sticks, two of which are a little larger and are placed close to each other, in adjoining positions	Cooperation
10	Seating proximity and arrangement: opposite	Four human silhouettes, two of which are a little larger and are placed opposite each other, facing each other	Four sticks, two of which are a little larger and are placed opposite each other, facing each other	Competition

[a] The social signals were formed in line with suggestions and examples provided by Vinciarelli et al. (2009).

[b] The facial expressions of emotions were based on the FACS (Ekman, Friesen & Hager, 2002).

[c] For the purpose of experimental procedure, the stimuli were grouped as follows: A= SoS stimuli 1, 3, 5, 7, 9; B=SoS stimuli 2, 4, 6, 8, 10; C=Non-SoS stimuli 1, 3, 5, 7, 9; D=1, 3, 5, 7, 9.

Procedure. The study was done in line with the microgenetic method of input identification (Kreitler & Kreitler, 1984, 1986c). Microgenesis is a paradigm of research in perception which focuses on the sequence of events occurring in the temporal interval between the presentation of a stimulus, and the formation of a single clear cognitive response to that stimulus. Methodologically it consists in the successive presentation of a stimulus under conditions of increasing clarity, for example, as when visial stimuli are presented tachistoscopically with gradually increasing exposure times until complete identification takes place (Flavell & Dragus, 1957).

To be able to study the microgenetic process it was necessary to produce a sequence of exposure values that would form at least an approximate interval scale. This was attained by combining three factors: exposure time (100, 75 or 50 msc); degree of focusing (full, partly reduced, greatly reduced); and brightness (high, medium, low). We used a 35 mm slide projector, with varying aperature size (ranging from 4 to 16 mm), and with a lens of 100 mm focal length (in front of which a Universal Shutter was placed). The three variables were used for defining 8 scale positions ranging from low to high exposure conditions. Pretest with 30 subjects were used for verifying that at each exposure level, the per cent of subjects identifying the stimuli would increase by 10-15%. Thus, the per cent of subjects who identified the stimuli were 10%, 20%, 30%, 45%, 55%, 70%, 85% and 100% in the successive 8 levels, from the first to the eighth, respectively. The stimuli used in these pretests were similar to those used in the study proper. At each level two stimuli were projected, different for each level.

The procedure of the proper study consisted in exposing each stimulus 8 times in a series, each time under better viewing conditions, representing degrees along the scale defined by exposure duration, focusing degree and brightness level. The experiment was conducted in individual sessions in one of the rooms of the department of psychology. The room was darkened. The tachistoscope was placed on a low table. The stimuli were projected on a white screen, in front of the subject, who was seated about 2 meters from the screen. The size of the images on the screen was 50cm X 80cm. A microphone and a tape recorder were placed at the side near the subject. A warning signal (i.e., a click) preceded each projection. The interval between successive exposures was about 3-4 seconds.

The task of the subjects was to report as completely and as immediately as possible anything they perceived. They were encouraged to report everything, even if they were not sure. Each subject was exposed to 10 stimuli in one session. The subjects were divided randomly into 4 groups, with 8 subjects in each. The stimuli administered to each group were as follows (see Table 2, Note[c]): Group 1: Stimuli A and C; Group 2: Stimuli A and D; Group 3: Stimuli B and C; Group 4: Stimuli B and D. The order of presentation of the stimuli in each group was randomized.

Results

The findings were elaborated for the two sets of stimuli – SoS and Non-SoS – in terms of the three phases of input identification described earlier. The two major aspects of the findings are the number of exposures and the meaning variables used in the three

phases of input identification. The means of the numbers of exposures were compared by t-tests. The meaning variables used by the subjects were identified by three judges who coded independently the recorded responses of the subjects. The judges did not know the identity of the subjects or the hypotheses of the study. The few cases in which the codings did not match were resolved by discussion among the judges.

Table 3 presents the major findings. It shows that the two sets of stimuli differed in terms of the number of exposures devoted to each of the three phases of input identification. In regard to the SoS stimuli the first phase was markedly brief, in fact it lasted for a number of exposures half of those in regard to the Non-SoS stimuli. The difference in this case was significant. The number of exposures for the second phase was somewhat higher for the SoS stimuli than for the Non-SoS stimuli but not significantly so. However, , in the third phase the number of exposures was significantly higher for the SoS stimuli than for the Non-SoS stimuli.

Table 3. **Mean number of exposures and major meaning dimensions in the three phases of input identification of SoS stimuli and Non-SoS stimuli**

Phases of input identification	***SoS stimuli: Mean no. of exposures***[a]	***Non-SoS stimuli: Mean no. of exposures***[a]	***t- values***[b]	***SoS stimuli: Major meaning dimensions***[c]	***Non-SoS stimuli: Major meaning dimensions***[c]
Phase 1	1.2 [0.5]	2.4 [1.2]	2.61*	Sensory Q.: brightness/ Quantity	Sensory Q.: brightness/ Locational Q./ Quantity
Phase 2	2.8[1.4]	2.1 [1.1]	1.11	Domain of application (subject)/ Quantity/ Actions/ State/ Cognitive Qualities & Actions (by the referents)/ Feelings & Emotions (a. & b. i.e., experienced by the referents and evoked by them)	Structure/ Size and dimensions/ Sensory Q.: color/ Sensory Q.: form/ Locational Q./ Range of inclusion
Phase 3	4.5 [1.8]	2.0 [1.6]	2.94**	Domain of Application (a. & b., i.e., subject and object)/ Judgments & Evaluations (a. & b., i.e., in regard to the referents and by the referents) / Feelings & Emotions (a.& b. i.e., experienced by the referents and evoked by them)/ Causes & Antecedent/ Results & Consequences	Meaning dimensions salient in the individual meaning profiles (none with a >10% frequency)

[a] The numbers in brackets are SDs.

[b] In regard to mean differences in number of exposures between SoS and Non-SoS stimuli: *p<.05 **p<.01

[c] The lists include only meaning dimensions to which at least 25% of the meaning values in the relevant phase referred.

Termination of the first phase indicates that the referent has been identified. The finding that the first phase lasted an average of 1.2 exposures in regard to the SoS stimuli indicates that the referent was almost immediately identified by the majority of subjects. The identified referent was in over 95% some version of the label "two people" or "human figure". For example, a subject would say "I can see something dark, it looks

like two people". Actually very little information was needed in order to identify the human silhouettes as "people". Assigning a label was more difficult in the case of Non-SoS stimuli: more exposures of the stimuli were needed and more information too. For example, a subject would say "there is something with two parts in the middle", whereby "two parts" would be a meaning value of the meaning dimension 'Range of inclusion', and "in the middle" a meaning value of the meaning dimension 'Locational Qualities'. Yet, in the first phase the kind of information that was grasped in regard to both types of stimuli was similar, except for the meaning values of locational qualities and of range of inclusion that appeared in this phase only in regard to Non-SoS stimuli. There are three meaning dimensions salient in the first phase in regard to both kinds of stimuli: Sensory qualities – brightness (e.g., "there is something dark"), Quantity (e.g., "there are two things") and Locational Qualities (e.g., "it is in the middle, in the center"). These meaning dimensions are essentially identical to those used in previous studies in regard to different Non-SoS stimuli (Kreitler & Kreitler, 1984).

In regard to the second phase of input identification, the difference between the two kinds of stimuli consists not in the number of exposures but rather in the kinds of information on which the respondents focus. In regard to the Non-SoS stimuli the meaning values that were mentioned most often referred to the structure (e.g., it has an inner core and an envelope), size (e.g., it is tall), location (e.g., in front and the back), range of inclusion (e.g., it has two parts), color (e.g., it is black), and form (e.g., it has the form of a stick) of the objects detected on the screen. These kinds of information (except for range of inclusion) were found also in former studies (Kreitler & Kreitler, 1984) as conducive most readily to a more veridical and comprehensive identification of the projected objects.

The kinds of information sought in regard to the SoS stimuli were different. Since the objects on the screens were already identified as human beings there was no need to focus on form, color, size and structure that might help in promoting the identification of the referents. The kinds of information mentioned in regard to the SoS stimuli were along the meaning dimensions of domain of application – subject (e.g., a woman, a person, an adult), quantity (e.g., two, many), action (e.g. they talk, move around, look for something), state (e.g., she sits, is relaxed), cognitive qualities and action (e., he thinks, she understands), Feelings and emotions (experienced, e.g., he is afraid, she is angry; evoked, e.g., it irritates him, it makes her happy). Notably, of these meaning dimensions only actions and state and sometimes quantity showed up in former studies when the object had been identified as animate. Thus, three of the frequently used meaning dimensions in the second phase were new (i.e., cognitive qualities and actions, domain of application, and feelings and emotions).

In the third phase, there were contents belonging to meaning dimensions shared by the majority of respondents only in regard to SoS stimuli. This indicates that these stimuli, in contrast to the Non-SoS stimuli, share common meanings of a certain kind. The nature of these meanings is unraveled to some degree by the meaning dimensions which characterize the responses of many subjects to these stimuli. These are the dimensions of domain of application (e.g., 'subject' – the figures are a boy and a girl; 'object' – they keep *their hands* outstretched), judgments and evaluations (e.g., a. in

regard to the referent – they are *important* people; b. of the referents – they believe that they can cooperate on the project), feelings and emotions (e.g., experienced – they are in love, evoked – she is afraid), causes and antecedent (e.g., they draw apart *because they mistrust each other*), and results and antecedent (e.g., they could not agree and *therefore they threaten each other*).

In order to test the hypothesis that the meanings assigned to the SoS stimuli express contents relevant from the perspective of social signals processing, the meanings assigned to the SoS stimuli in the third phase of input identification were presented to two independent judges for evaluation. The task of the judges was to state in regard to each of the 160 meanings to what degree it expressed some kind of social interaction or interpersonal attitude. The judgments were done in terms of three categories: yes, maybe, no. The judgments were unanimous and positive in regard to 82.5% of the cases, and in a further 10.6% differing in one step (i.e., one judge checked 'yes' and the other 'maybe'). Only 6.9% the judgments were unanimously negative.

Discussion

The findings of the study showed that stimuli with special structural features are identified early in the process as representing human figures in social interaction. As such they are subjected to processes of meaning elaboration resulting in the construction of meanings readily grasped as expressive of interpersonally relevant attitudes. The major differences in meaning assignment of SoS stimuli and Non-SoS stimuli were evident in the three phases of input identification. In the first phase of input identification SoS stimuli were identified much faster, almost instantaneously, as representing human figures. In the second phase, the meaning was elaborated not only in the standard terms of the actions and state of the perceived figures, but also in terms of their feelings and cognitions, representing their inner life and attitudes. In the third phase, the individually characteristic meaning assignment tendencies were mobilized for the sake of expressing meanings shared by many respondents and representing interpersonal attitudes indicative of potential social actions, such as getting closer, drawing apart, getting involved or disconnected, cooperating or competing, and sharing emotions like surprise and happiness.

The findings of this study confirm the major conclusions of previous studies about the meaning processes involved in input identification (Kreitler & Kreitler, 1984; Kreitler, in press-b). This conclusion provides further validity to the conception that input identification is basically an act of meaning assignment. Accordingly, applying the constructs of a theory of meaning for studying input identification is adequate and potentially a platform for fruitful insights.

The major findings of previous studies that have been confirmed in the present one concern, first, the partition of input identification into three phases defined by identifying the referent, confirming the referent and elaborating the referent; and secondly, the contents of the three phases in terms of the involved meaning dimensions. The three phases apply to both the Non-SoS stimuli and the SoS stimuli. However, the processes involved in the identification of these two types of stimuli differ. It is of importance to

dwell on the differences so as to better conceptualize the specific characteristics of the identification of socially-relevant inputs. Notably, the meaning variables found to define the three phases of the Non-SoS stimuli replicate most closely the findings in regard to stimuli used in previous studies (Kreitler & Kreitler, 1984; Kreitler, in press-b). This is not surprising, since as mentioned above, the stimuli in these studies were also of the Non-SoS type. The replication of the findings lends additional support to the original conclusions in regard to meaning assignment in perception. However, the meaning variables that were used in regard to the SoS stimuli in the present study were of a different kind.

Notably, the fact that the meaning variables used in the first phase were mostly identical to those used for Non-SoS stimuli indicates that the processes involved in the basic identification proper of the stimuli are the same regardless of the social or neutral nature of the stimuli. In the second phase there are more differences in the involved processes between the SoS stimuli and the Non-SoS stimuli. The major differences seem to be due to two factors. The first is the animate character of the SoS stimuli. The previous studies showed that the meaning assigned to stimuli representing animate beings differs from that assigned to inanimate ones. The former includes references to the action and state of the represented animate beings, while the latter include references to the structure, size, location, color and form of the represented non-animate objects. The meaning variables involved in the meaning assignment to animate beings and inanimate objects serve in each case the elaboration of the specific stimuli. This, for example, in regard to animate beings state and action are more important aspects of meaning than structure and form that are largely superfluous since they may be inferred from the identification of the being as animate (i.e, the structure and form of an animal or a person are included in the identification of something as an animal or a person).

However, there are further differences between the meaning variables used for SoS and non-SoS stimuli that are not explained merely by the animate nature of the SoS stimuli. The further factor responsible for the differences already on the level of the second phase of input identification is the social character of the stimuli. This conclusion is based on the nature of the meaning variables that were used by the subjects in the input identification of the SoS stimuli: the emotions of the represented beings and their thoughts. These two aspects are of particular importance when we are dealing with beings suggesting some sort of social interaction.

The impact of the social aspect of the represented stimuli is further enhanced in the third phase of identification which is largely devoted to meaning assignment. In this phase the major meaning variables added by the subjects referred to further aspects of the represented beings that could play a role in better understanding their social nature. These included dwelling on the meaning variables indicating who the represented beings are, for example, in terms of gender or occupation (i.e., the meaning variable of range of application); what their attitudes, beliefs, opinions and judgments are and how they are to be evaluated (i.e., the meaning variable of judgments and evaluations); what are the causes or antecedents for the represented situation and what are its consequences and implications (i.e., the meaning variables of causes and of results). It is evident that the

aspects of meaning indicated by the meaning variables used in elaborating the meaning of the SoS stimuli are of the kind that subserve the goal of promoting and facilitating social interaction.

There is, however, a further aspect of the findings that sheds more light on the nature of social stimuli and their role in our life; it is the fact that the meaning variables used in assigning meaning to the SoS stimuli were largely shared in common by the different subjects. This is evident particularly in the third phase where none of the meaning varaibles used in elaborating the meaning of the Non-SoS stimuli were shared. This reflects the nature of social reality that is based largely on consensual meanings. In regard to Non-SoS stimuli that represent inanimate objects there seems to be much less need for consensuality and hence much more freedom for the expression of individual and personally shaped meanings than in regard to stimuli representing animate socially-relevant beings, namely, human beings with whom we are continuously interwoven in complex social interactions.

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"A Scientific Journey". On Experiencing Qualitative Research

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The first aim of the paper is to present the changes observed in the authors' experience while conducting a qualitative research element in the empirical research for our Ph.D. dissertations. The second aim is to describe how the practice of research and reflection are related and how understanding of the research results has been modified upon reflection. It was mainly the qualitative research element we encountered that made the process of writing our dissertations a scientific journey. The essential outline of the dissertations is also described.

Key words: qualitative research, dissertation, openness, reflection, scientific journey

Introduction – towards openness and reflection

The qualitative approach towards scientific research is an alternative or complement for the quantitative approach. It is based on specific assumptions on the nature and methods of exploring reality and ways of presenting research results. The assumptions on the nature of reality in the qualitative approach as held in this thesis are that psychological and social phenomena are diverse, unique and cannot be reduced to other phenomena (Straś-Romanowska, 2000; Paluchowski, 2000). The best method of researching reality is by adopting the approach originating from the works of Dilthey (after: Harrington, 2001) understanding (*verstehen*) and collecting data by means of observations, conversations with people and analysis of this material (verbal or visual) conducted in such a way that allows for an understanding of the meanings employed by these research participants. The qualitative approach is implemented in many branches of social sciences, e.g. ethnographic research, phenomenological analysis in psychology, narrative research or grounded theory (cf. Creswell, 2003, 2006; Moustakas, 2001). Common features of quantitative research presented in the literature are (Moustakas, 2001; Flick, 2007) as follows:

- recognizing the necessity of reaching out to specific human experience;
- focusing on the whole and the context of experiences and actions;
- searching mainly for sense and meaning rather than explanations;
- personal commitment and interest of the researcher;
- description or interpretation as basic procedures of the research process;
- circular character of the research analysis;
- flexibility in the scope of implementing and selecting procedures.

One of the frequently emphasized features of qualitative research is openness (Watts, 2008) which allows the researcher to fully make use of the inductive character of the research process. Openness may be in regard to the subject of the research and it may identify a competence of the researcher. According to the so-called Hamburg school, the researcher should treat the research problem (thesis) solely as a determination of the course of action. The researcher should therefore be open to the research topic and accept the temporary character of the goal and research question. Openness is connected with the researcher's readiness to change his or her former conception during the research process and to treat the research process as a learning one and the participants as partners in bi-directional communication (e.g. openness of the research person and the research design – Gürtler et al., 2001). Due to such features, it is difficult to find linearity and algorithms of conduct procedures in qualitative research.

One of the methods of caring for the methodological wellness of qualitative research is by giving it credibility by reporting on it accurately to the scientific community, so that they can establish their own opinion on the research and understand the decisions of the researchers (Richards, 2002). The decisions made by the researchers are not deprived of a subjective element. During the stage of planning the research, as well as during the interpretation of the results, the researchers proceed from their own, individual perspective. Qualitative researchers observe themselves in order to identify and prevent partiality (bias). Moreover, they engage in a kind of thinking in action, often referred to as a reflective practice, learning (Korthagen, Vasalos, 2010) or researcher reflexivity (Hammersley, Atkinson, 1995). Usually, the effect of this is a rich reflection on the whole research process, connected with the professional and personal development of the researcher. The process of reflection is strongly connected with writing, noting and reporting on the research from the researcher's own perspective of awareness (e.g. Blaufuss, 2007; Schnee, 2009; Richardson, 1990). As Hammersley and Atkinson (1995) write, the whole process of qualitative research is a textual activity. Writing is engaged in at every stage of the research process, including the taking of notes during the study of literature (Weiland, 2003). Writing is an expression of the professional and personal development which occurs while implementing the research project (Meloy, 1994).

Research conducted with the qualitative method presents new possibilities for the researcher's personal scientific development. On one hand, due to openness to the topic of the research and the persons participating in it, it is possible to be flexible in formulating and reformulating the research problem. On the other hand, the requirement to report on the research results favors a complex and recursive reflection in which the researcher becomes increasingly more aware of his or her participation in the scientific research process.

The first aim of the following discussion is to present the changes we have observed in our experience while conducting a qualitative research element within the empirical research for our Ph.D. dissertations. The second aim is to describe how we have modified our research and understanding of the results in light of the use of qualitative methods. It was mainly the qualitative research element we both encountered that made the process of writing our dissertations a scientific journey.

The position of a qualitative element in empirical research of the authors' Ph.D. dissertations

Due to the exploratory character of our research and our aim to extend the understanding of the researched fields, it was important to conduct qualitative research. Below, we present an essential outline of our work.

Emilia: The topic of my Ph.D. dissertation was "The level of (self) narrativity of utterances and the usability of selected methods of self-narrative elicitation". I conducted research on the efficiency of methods of generating self-narration by research participants during the interview process. I attempted to quantitatively (linguistically) determine the level of (self)narration of discourse collected while using qualitative methods (psychological interviews). The qualitative element of my research included the following: 1) a focus on qualitative methods of collecting data – extensive qualitative interviews; 2) additional contact with the persons participating in the research and consideration of their comments while understanding how methods of generating self-narration work. The methodology I employed may be described as a mixed approach of sequential character (according to the classification by Creswell, 2003), in which the data was collected in a qualitative manner and the analysis was mainly conducted quantitatively.

Anna: The subject of my research was the subjective determinants of diagnostic strategies used by psychologists, such as general cognitive preferences (the cognitive style and the need for cognitive closure) and preferences specific for their work as psychologists (the theoretical paradigm). The source of inspiration for taking up and broadening the understanding of this topic was not only the existing literature but also conversations with practicing psychologists (a qualitative method of collecting data), conducting classes with students (exercise in basic diagnostic skills) and therapeutic work with patients. The methodology I employed may be described as mixed (Creswell, 2003). In one research project I used elements of two strategies: sequential in the exploratory version (at the first stage of research – collecting qualitative data and carrying out a qualitative analysis, at the second stage – collecting also quantitative data and carrying out a quantitative analysis) and simultaneous (at the second stage of research – simultaneous collection of qualitative and quantitative data and comparison of analysis results).

Openness in the qualitative research process – the value of relationships with research participants and self-awareness of the researcher

The researcher's openness in the qualitative approach applies to the research topic, the research procedure and research tools. It is interesting that the stimulus for various modifications and changes during the research process may come from the persons participating in the research themselves. Understanding the research participants means approaching their experiences by adopting a philosophy of "understanding", which refers to a researcher's tendency to discover the meanings which people give to their experience, and considering the research participants as experts of their own lives. We learned life stories of participants, we were their confidants, we were committed to them. One of us (Emilia) in her research asked the participating persons about important

experiences and events in their lives. The other (Anna) was focused upon listening to narrations about their professional experience. We wanted to understand in what kind of experiential world did the people participating in the research live, and how did they create it. One of the dilemmas we encountered during this process was connected with involvement in the research from a position of not-knowing (the so-called *going naïve* postulate) and maintaining it in contacts with all of the research participants. The more interviews we conducted, the more we needed to control of our own partiality. At the same time, thanks to the personal stories of the participants, we became aware that we were experiencing the "lived experience" (e.g. Lindseth, Norberg, 2004) of the persons participating in the research and our motivation as well as commitment to continue this time-consuming research considerably increased.

We made attempts to control our own partiality by writing down (in our personal notes) and describing the various conditions we were subjected to, our position at the beginning of each interview, what emotions and mood accompanied us during the interview, and what were our expectations from the contact with each research participant (positioning – Caelli and others, 2003).

Becoming involved in the experiences of the research participants prompted us to be more receptive in considering their comments about the research, and to take their perspective and opinions into account while conducting further stages of the research, during the analysis and interpretation of the results. We believed that we should not ignore additional statements or comments from the participants, and remained open to change in the implementation of the research project. Of course we did not want to change the project completely or to abandon the hypotheses. Our aim was to gain scientific inspiration from personal contact with the participants. We would like to present some examples of our approach, being aware that other researchers might make different decisions in similar situations. The following examples present rather difficult moments and our attempts at facing them.

Anna: At the first, exploratory stage of the research I used some assumptions from the grounded theory methodology formulated by Glaser and Strauss (1967). The assumptions I used were in regard to the method itself, but my research goal was not an attempt at formulating a new theory, what is the primary target of research stated by this methodology. Among the emphasized basic formal features of the grounded theory (Glaser, Strauss, 1967), I considered the following: a minimum of research pre-conceptualization, and reflecting the psychologist's work thoroughly. Reducing theoretical assumptions to a minimum allowed for the exploration of new phenomena, and as a result I was able to discover phenomena which I had not looked for at the beginning of the research. In connection with the fact that the topic I was researching (individual differences in the strategies employed by psychologists in the process of diagnosis) has been relatively little examined, defining the research problem required conducting prior exploratory research with a minimum of pre-conceptualization. The research problem was changed many times during the process. For instance, at the initial stage of the research, I asked psychologists what rules do they use in the process of carrying out an assessment and making a diagnosis. During conversations with psychologists, I noticed the fact that they employ different diagnostic strategies, and then I began asking questions about the conditions of using given strategies. Some persons

said that they waited for a long time before stating a diagnosis, whereas others said that they were led by intuition and made fast decisions. What I heard about the process of diagnosis from the professionals allowed me to make the research problem more precise. The consequence of employing the first assumption of grounded theory (a minimum of pre-conceptualization), I believe led to a better adjustment of the conceptual categories which were then used to define the actual reality of their experience. Because of the differences between the "academic model" of diagnosis and the actual conduct of professionals, it was important to refer to that which practicing psychologists actually told me. In the scope of grounded theory methodology, there is a possibility of modifying all elements of the constructed theory – conceptual categories, their features and hypotheses. Participants quite directly helped in this theory construction.

Emilia: First, I would like to write about the changes in the research process which were inspired by conversations with research participants in regard to the initial questionnaire tool. The problem appeared at the stage of selecting participants for an extensive qualitative interview. The selection was made with the use of a questionnaire, which I had constructed for this purpose. The questionnaire measured the so-called "self-narrative inclination", which is one's tendency to talk about his or her life story in a narratively structured manner. First, the research participants filled in the questionnaire, and then, if they had indicated extremely high, low or near-average (selected on the basis of the standard deviation) results, they were invited to participate in the interview. One of the first persons participating in the interview said that he had filled in the questionnaire with an unwillingness to share personal information but he considered himself as a good storyteller. He suggested that the content of the questionnaire statements may convey not only a tendency for narrative structuring, but also a tendency to share one's biographical information in an extraverted, public manner. This reflection on the content of the questionnaire statements prompted me to identify those statements which were bearing this characteristic, which I named "publicising". Raters (competent judges) evaluated the questionnaire statements for the presence of "publicizing". Upon the basis of the raters' evaluations, a sub-scale was created, and this changed the way in which the total results of the questionnaire were analyzed. Thus the participant's comments helped me to clarify the psychological variable I was intending to measure.

Other issues, also connected with openness to the views expressed by the research participants the following changes emerged: upon the basis of the pilot interviews a modification of the instruction which generates self-narration in the interview, and changes in the method of asking questions took place. I will discuss these two modifications now. I regarded the first three interviews as a pilot study and I have not included them in the final analysis. Each interview consisted of two parts: in the first part I asked the research participants about positive experiences or events, and in the second part about negative ones. The order of the topics was random. The choice of these topics was inspired by a life story interview which was conducted by McAdams (1995). In the life story interview we find questions about peak and nadir experiences. The first persons participating in the pilot study, during the part of the interview regarding their negative life event, told me about experienced traumatic events and were clearly emotionally moved. However, in the final part of their narratives, they emphasized the importance of this experience. While thinking about why this happens, I decided to analyse the

instructions and my method of asking questions. In the initial version of instructions regarding the negative experience, I used the following phrase: "tell me about one of the most difficult, negative events or experiences in your life." After the analysis of the pilot study data, I changed the phrase into the following: "tell me about a difficult, negative event or experience in your life" (I changed the instruction for positive topics in a similar manner). I resigned from the question about peak and nadir experience, asking about less strong (not "the most difficult") positive and negative experiences instead. I realized that the purpose of this research was not to make an in-depth personality diagnosis, but rather to generate self-narration for purposes of determining the features of self-narration. Therefore, it was not important whether the events recalled by the participants were to a greatest extent positive or negative – it was important that the research participants could take up a narrative evaluation of an autobiographical experience. Encouraging them to talk about the most difficult or cheerful experience was not necessary, and I realized that this could have been perceived as being too personally intrusive, therefore, becoming unethical. The modified instruction did not discourage the research participants from talking about the most important events they had experienced, including those which provoked negative emotions, if they so desired and decided. However, it gave them more freedom in making decisions what event or experience to bring up and include in the interview. This modification of the interview instructions was also very beneficial for me, because I felt relieved that I would not be leaving the impression of being too intrusive, and therefore I became more open to the participants' feelings and emotions when they did decide to narrate deeply moving experiences. It helped me to remain neutral and as non-directive as possible.

The observed reactions of the research participants to the instruction in the interview made me analyse the method of asking questions. Wanting to confront my own abilities and competence in conducting interviews, together with a professional clinical psychologist I listened to recordings from the pilot study and analysed my behaviour. It appeared that the intonation which I initially and unintentionally used, might have encouraged a deep emotional reaction from the participants. Due to this consultation, I decided to ask the interview questions with a slightly higher intonation (pitch) and to introduce an additional reference to emotional awareness during two moments of the conversation. If, while answering the question regarding a negative experience, a person showed non-verbal signs of aroused emotion, I added "it is possible that while talking you will experience emotions similar to those from the past". When no indications of experiencing negative emotions appeared, this sentence was not uttered by me, as it could have had an unnecessary intervention effect. Additionally, after each interview, when I turned off the voice recorder, I added the following sentence to allow the participant to abreact: "you have mentioned important personal issues, and if they are still with you, you can tell me about them, and I will listen to you." During the actual research process a few persons did take this opportunity. This experience made me wonder and also realize how was I communicating with the participants and thereby influencing the process of data gathering.

I was clearly aware of the fact that I am going to be asking the research participants about their personal lives, and I was wondering if the procedure I employed was sufficiently safe and friendly. Before the pilot study I took the opportunity of being

examined within my own research project. I asked a colleague to do an interview with me according to the planned procedure (cf. the so-called *bracketing interview*), and to discuss it with me in conclusion. My own experience as an interviewee and my colleague's participation may be seen as a kind of a peer debriefing procedure, strengthening a qualitative study's credibility (Hays & Singh, 2012). While responding to the interviewer's questions, I experienced vivid emotions connected with the events I was recalling, events which I do not remember on a daily basis. It was like recovering something previously hidden and bringing it into my life, and this experience undoubtedly exceeded the research situation and I felt relieved. This experience of being an interviewee allowed me to be more empathic as an interviewer, and to be less afraid of similar emotional reactions from persons participating in the research. In general, this experience strengthened my sense of competence in the practice of interviewing and helped me in maintaining rapport with the succeeding interviewees. Moreover, I realized that the qualitative interview – when a personal relationship with the interviewer is established – is also a vehicle for personal development and self-awareness, as it is often pointed out by other authors (e.g. Kvale, 2007).

Anna: While planning my research, I was not sure whether it would be better to ask psychologists conducting a diagnostic task (for example, nosologic diagnosis of a person suffering from schizoid personality disorder) to write a diagnosis, or to think out loud. I asked one person to read a case description and to write down his diagnostic hypotheses. After performing this task, the person said he did not write down everything he thought about, but only included his final conclusions. That made me alter the research procedure and to employ a technique of thinking aloud. As I realized during conversations with the psychologists participating in the study, they did not share all of their thoughts while performing the diagnostic task. I did not find a better method of evaluating diagnostic strategies, but during the analysis I remembered that the psychologists had indicated to me that they did not share all of their ideas. Noticing all of the constrains of the thinking aloud technique, made me to wonder how would it be possible to improve the procedure of studying the diagnostic strategies in future research. For example, the procedure applied in my research did not allow me to obtain all of the information used by the psychologists in their individual decision-making process. As a better medium to register and analyze the decision-making process and to make the process more transparent, the software Mouselab (www.mouselabweb.org) might be used. This software is based on the information board rule – research participants (diagnosticians) are asked to open any number of windows. The Mouselab will allow the researcher to gather the information about the amount and order of diagnostic information used by the diagnosticians in their decision-making.

As it can be seen in the examples mentioned above, changes in our functioning as researchers took place as a result of the mutual influence between us and the persons participating in the research. We had the opportunity to experience and recognize the impact, which, as Paluchowski (2007) writes, the evaluating mind has on the evaluated minds. We influenced the persons participating in the research by offering them participation in a particular procedure which had specific consequences. However, it also was mutual: we remained under the influence of these persons' actions and the feedback they gave us. The phenomena of how important the actions of the persons

participating in the research have become to us (their way of participating in the research, their comments, etc.) depended on employing an attitude of openness which qualitative research allows for.

Conclusion – the rite of passage

Our report would not be complete if we did not mention one more aspect in regard to which changes were made during the implementation of the research project. It concerns the immersion of qualitative research into our own lives. In our opinion it significantly exceeds the typical scientific psychological career development. During many moments we experienced not only the research participants' way of understanding (hearing their "voice" as persons), but also a kind of personal self-understanding. This entailed a revision of our understanding of our own resources as well as professional and personal limitations (Weiland, 2003; Etherington, 2004; Chase, 2003; Reisetter, 2003 writes about similar experiences). We gained a new perspective, for example, on our own listening skills and a change of opinion on the nature of meeting (contacting) other people. We understand today why perfecting qualitative research and the act of describing it (especially in such a paper as a Ph.D. dissertation) is sometimes called the rite of passage (cf. Noy, 2003). To us this rite of passage had a social aspect (entering the community of scientists) as well as a personal one (achieving a difficult goal). As it can be seen, we conclude this article with a feeling of competence and the satisfaction of a well performed task, which can be an effect of the fact that we try to integrate the gained experience in our professional and personal identities. However, we will not forget about the uncertainties which accompanied the decisions described in this article. As it is sometimes highlighted, qualitative inquiry is a journey, not a destination (Hays & Singh, 2012).

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REPORTS OF EMPIRICAL STUDIES

Improving Performance in Groups: Effects of Two Different Goal-Setting Strategies and Feedback on Brainstorming Performance

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An experiment was conducted with the aim of examining the joint effect of group feedback and group goal-setting (directive or participative). Goal-setting was believed to have positive effect on brainstorming performance because it counteracts motivation losses (e.g. social loafing) and promotes motivation gains (e.g. social compensation). Feedback helps individuals calibrate their degree of goal accomplishment, the level of effort needed to reach the goal, and changes that are necessary. Similarly, groups that set goals and receive feedback on their goals are more likely to improve their performance than groups that do not. Results showed that goal-setting, particularly participative, affected brainstorming performance while feedback did so only by interaction with goal-setting.

Keywords: group performance, goal-setting, feedback

Introduction

Collaboration in teams is time-consuming and requires a lot of effort from individual team members. The question as to whether increased teamwork or increased independence for teams is worthwhile for organizations is difficult to provide a general answer for. It seems that teamwork is better in certain circumstances, while individual work is more beneficial in other circumstances. Compared to more individually-based work design, collaboration in teams has been found to enhance communication, innovation and the quality of decision-making (see e.g. Cohen & Bailey, 1997; Kerr & Tindale, 2004). On the other hand teamwork is known to be associated with specific motivational and coordination problems, such as production-blocking (Nijstad, Stroebe, & Lodewijkx, 2006), evaluation apprehension (Paulus, Dugosh, Dzindolet, Putman, & Coskun, 2002) and social loafing (Karau & Williams, 1993). Social loafing is the tendency for individuals to expend less effort when working collectively than when working individually.

It has been shown that group interaction leads to a reduction of experienced failures which can affect the perception of work satisfaction (Nijstad, Stroebe, & Lodewijkx, 2006). Non-structured or conventional interaction style is characterised by undue influence of high-status people (Hare, 1976), pressure for conformity (Hoffman,

1979), and motivation losses (Karau & Williams, 1993). These are well-known social psychological phenomena interfering with teamwork processes and inhibiting coordination among team members.

To deal with this inhibition associated with production-blocking, brainstorming was developed (Osborn, 1963). More recently, following the failure of traditional brainstorming attempts to improve teamwork processes, new methods of brainstorming have been developed. Among these new improved methods are the following: using a facilitator (Oxley, Dzindelot, & Paulus, 1996); NGT or brain-writing (e.g. Paulus & Yang, 2000); stepladder approach (Rogelberg, O'Connor, & Sederburg, 2002); electronic brainstorming (Pinsonneault, Barki, Gallupe, & Hoppen (1999); and individual planning prior to interaction (Eisele, 2011).

Recently Wegge and Haslam (2005) examined the efficiency of setting specific and challenging group goals. In their study three goal-setting strategies were used: (1) directive group goal-setting (2) participative group goal-setting; and (3) participative and individual goal-setting in combination. Groups in the control setting were instructed to do their best.

The aim of the present study was to examine the joint effect of goal-setting and feedback on brainstorming performance.

Theoretical Background

Feedback

Although there is substantial literature on the role of feedback in performance at the individual-level (cf. London & Sessa, 2006), the role of feedback in groups to individual members or the group as a whole has not been explored in much depth (Bunderson & Sutcliffe, 2003). However, Barr and Conlon (1994) examined the joint effects of group feedback and individual feedback, and results showed that positive feedback resulted in greater persistence of intentions among group members.

At the individual-level it is well accepted that goals and performance feedback are the most effective interventions available to improve learning and performance (e.g. Locke & Latham, 2002). Groups use feedback about their actions and choices to determine behaviors that should be repeated in the future when the same or similar circumstances arise. Behaviors that do not work are dropped from the group's repertoire or modified until they do work.

A related characteristic of the group's repertoire of behaviors is group members' collective efficacy, which refers to perceptions regarding group confidence or belief in its ability to accomplish goals (see Campion, Medsker, & Higgs, 1993; Guzzo, Yost, Campbell, & Shea, 1993), or group potency (Jung & Sosik, 2003). Group potency and collective efficacy have been found to influence group effectiveness, perhaps through a mediating relation between feedback and performance (Jung & Sosik, 2003). Feedback that influences a group's confidence in its ability to learn may affect the group's readiness to learn.

Second, feedback allows the group to assess its boundary openness to outside influences so that this openness can be made more appropriate (Alderfer, 1980).

Factors outside the group may influence groups so that they make more errors. With appropriate feedback groups may learn to be more open to errors with the potential of less detrimental consequences in the future.

Third, feedback can develop the group into engaging in more interdependent work. The learning that occurs in the group is commensurate with the stage of development of the group (Hackman & Wageman, 2005). During the early formative phase groups need to be motivated if they are to understand group goals, timelines, expectations, and potential rewards and how each member can contribute. During the task accomplishment stage groups need task-oriented guidance and structure, including the acquisition of new skills and knowledge. During the final post-task stage, particularly after the group task has been accomplished, the group has time to reflect on what was learned as a group and as individual members (Hackman & Wageman, 2005). That is, different types of feedback may need to be obtained at different stages to ensure that the group can use the feedback appropriately.

Newcomers to a group can learn and become more valuable to the group sooner if they receive feedback than if they receive little or no feedback. Newcomers need to adapt their behavior to the demands of the group. Variables such as newcomer empowerment (e.g., feeling of being able to affect one's environment positively), group expectations, and group performance determine newcomer socialization and performance in already-established groups (Chen & Klimoski, 2003). Newcomers who are able to obtain needed skills and knowledge, express innovative ideas, work well with others, and go above the call of duty are likely to improve their performance more quickly, and feedback aids their ability to adapt (Chen, 2005).

Fourth, feedback can help members see that their group is related to other systems. It can help group members recognize that other groups, the organization of which they are a part, and external groups and organizations share a common view of the world (a unified or shared mental model). Feedback can help a group develop a unified or shared mental model, that is, a similar view of expectations and awareness about behaviors, abilities, knowledge, and skill levels; group members' knowledge and skills; understanding of the task and goals; and a mutual interpretation of shared events.

Group feedback may change members' focus from themselves as individuals to their group (Hinsz, Tindale, & Vollrath, 1997). Also, group feedback may increase members' sensitivity to the environment by helping them recognize that other members may have made different choices than they did themselves (Tindale, 1989). Explicit communication about expectations and goals at the outset promotes the development of a unified mental model. Feedback about behaviors and performance during the task enhances the development of this model and facilitates coordination and task accomplishment.

The question of whether feedback should be provided to each individual team member or to the team as a whole has been debated and studied for more than half a century. In favor of team-level feedback are Berkowitz and Levy (1956), and in favor of individual-level feedback is Zajonc (1962). Nadler (1979) found that team-level feedback resulted in improved attitudes toward the team and individual-level feedback improved performance. Tindale, Kulik and Scott (1991) argued that improved

individual performance did not necessarily result in improved team performance. These results indicate not only that it is important to manipulate and/or measure at both levels, but also that it could be a good idea to conduct analysis both at the team-level and the individual-level. London and Sessa (2006) argued that the processing of feedback may be influenced by both group and individual conditions and therefore they made analysis at both levels.

Passos and Caetano (2005) tested a model of the effects of intragroup conflict which described relationship conflict, task conflict and process conflict, and its relation to decision-making processes and team performance. The result indicated that effective past performance feedback had a positive influence on team performance.

Goal-Setting

Goals impact task-related behavior presumably because they direct attention toward the most relevant aspects of task performance. The positive effects of goal-setting in teams have been explained by the processes that counteract motivation loss (see e.g. Wegge, 2004). Three main aspects of motivation loss in groups have been proposed by Karau and Williams (1993): 1) social loafing (unintentional reduction of effort when working in groups); 2) free-riding (deliberate reduction of effort when working in groups); and 3) sucker effect (deliberate reduction of effort as a result of perception of free-riding among others). For more information about social loafing and free-riding see Karau and Williams (1993), and for the sucker effect see Kerr and Bruun (1983). Motivation gain in groups could increase when group task is perceived as meaningful (Karau & Williams, 1997).

Goal-setting theory (Locke & Latham, 1990) describes which type of goals are most effective. Specific and difficult performance goals lead to better performance than easy or unspecific goals. Goal-setting improves performance because better task focus and use of task strategies leads to increased effort and persistence (see e. g. Locke & Latham, 2002). Goal-setting theory has so far mostly dealt with single individuals. However, goal-setting at the team-level has been acknowledged as of late (Locke & Latham, 2006). Sometimes individual goals and group goals are in conflict with each other because group goals suggested by group leaders are not agreed upon by all group members (see e.g. Crown & Rosse, 1995). For example, some people argue for individualistic goals and some for collective goals (Wegge, 2004), and the existence of additional types of goals for groups like communication and planning goals (Weldon & Weingart, 1993). In short, goal-setting theory should be extended if it is to be applied to the team-level (Wegge & Haslam, 2005).

There is some evidence that goal-setting decreases motivation losses (see e.g. Matsui, Kakuyama, & Onglatco, 1987; van Leeuwen & van Knippenberg, 2002). The combination of group goals and individual goals was found more effective than only individual goals (Matsui, Kakuyama, & Onglatco, 1987). When there is no specific goal, the participants matched their own performance to the performance of other group members, this social matching did not exist when goals were specific (van Leeuwen & van Knippenberg, 2002).

Most studies that examined effects of goal-setting have been conducted at an individual-level (see e.g. Wagner, 1994). In one recent attempt to study group goals (Wegge & Haslam, 2005) the authors examined effects of different types of group goals, directive, participative and the latter in combination with individual goal-setting.

Goal-Setting and Feedback

Goals and feedback are both among the most common methods used to improve team effectiveness. Feedback helps individuals calibrate their degree of goal accomplishment, understand the level of effort needed to reach the goal, and to make necessary changes. Similarly, groups that set goals and receive feedback on their goals are more likely to improve their performance than groups that do not (Locke & Latham, 2002; McLeod, Liker, & Lobel, 1992). McLeod and colleagues (1992) examined health-related behavior changes and showed that larger behavioral changes occurred when groups received specific, challenging goals compared to moderate or general goals instead of information about ideal ranges. Whitney (1994) showed that group goal commitment and group cohesiveness was congruent with group efficacy beliefs.

Deshon, Kozlowski, Schmidt, Milner and Wiechmann (2004) suggested and tested a model of how individual team members use feedback to improve individual and team performance. The use of both feedback and goal-setting in the design was motivated by the postulate that teamwork requires regulation of individual behavior with respect to multiple goals. Both individual feedback and team feedback was examined. Positive effects of feedback promote strategy selection. However, if there is a lack of motivation to perform for the group, the likelihood that feedback results in better strategy selection is rather small. Allocation of resources toward both individual goals and team goals is likely to improve appropriate use of feedback. Therefore, goal-setting and feedback is assumed to interact and affect performance jointly (Deshon et. al, 2004).

In the present study both participative goal-setting and directive goal-setting as well as feedback were the independent variables. Performance and social processes before and after the experimental manipulations was measured with a questionnaire based on work by Wegge and Haslam (2005).

Hypothesis

1. a) Group goal-setting instructions will increase idea-generating performance as compared to control instruction.
1. b) Group goal-setting instructions will decrease motivation losses (expect less free-riding).
1. c) Group goal-setting instructions will increase motivation gain (goal commitment, social compensation, group cohesion, group identification, intrinsic work motivation, further team cooperation).
2. a) Feedback will increase idea-generating performance as compared to control instruction.
2. b) Feedback will decrease motivation losses.
2. c) Feedback will increase motivation gain.
3. There will be interaction effects between goal-setting and feedback.

Method

Participants

The sample consisted of 150 students, 123 men and 27 women with a mean age of 24.6. All participants were fluent in the English, 80% were from Pakistan, 12% from Africa and 8% from Europe. The participants worked together in groups during the experimental tasks, in 30 five-person groups, during a summer course in economics.

Group Task and Design

Working together as a group, participants had to find and write down individually as many different uses for common objects (e. g. hairbrush) as they could.

A 3 x 2 randomized group design was used and the six control groups were instructed to do their best during the manipulation phase of the study. Trial 1 was a practice session, trial 2 a baseline session and at trial 3 the experimental manipulations was done. The groups were given either participative goal-setting, directive goal-setting, no goal-setting and feedback, or no feedback.

Measures

The scales were originally developed by Wegge (2004) and based on work by Wegge and Haslam (2005), and used with permission from the authors. The questionnaire is directly associated with relevant goal-setting conditions.

Demographic data. Questions about the following were asked before the first measurement phase: age, gender and ethnical background. Gender and ethnicity was matched across conditions.

Observational data. For each group 2 independent observers rated on a separate sheet the following aspects of the group processes: individual performance (number of different uses); group performance (the total number of unique uses); and individual suggestions for group goals.

Perceived participation. As a manipulation check, participants responded on a 4-point scale to the following items: "I had a real voice in determining which group goal we selected to strive for".

Group goal commitment. Group goal commitment was measured by means of nine items on 4-point response scales. Example item: "If the group reaches its goal, this will have pleasant consequences for me".

Group cohesion. Six items on 4-point scales. Example item: "If you are a member of this group, you can feel proud".

Group identification. Four items on 4-point scales. Example item: "The group I belong to is an important reflection of who I am".

Social compensation. Three items on 4-point scales. Example item: "If other group members fail to solve the group task because they do not have enough ability, I will work especially hard to reach the group goal".

Value of group success and value of group failure. One item on a 5-point scale. Example: "Please mark on the following scale how valuable the success/failure of the group would be for you".

Expect no free-riding. This was measured with three items on a 4-point scale. Example item: "In my group we have a free-rider who is taking advantage of other group members".

Intrinsic motivation. Three items on a 5-point scale. Example item: "Even if we were not successful in reaching the group goal, the group task was interesting".

Desire for further team cooperation. Three items on a 4-point scale. Example item: "I can imagine solving more tasks with this group".

Procedure

Participants were asked to participate in the study conducted during a summer course and were matched according to gender and randomized to the 3x2 conditions in the experiment.

Before the groups were seated, participants were first requested to answer the questionnaire on demographic data. Next, groups were formed according to the randomization and matching schedule. The matching was done by blocking ethnical differences. Participants in the directive goal-setting condition were asked to take into account relevant goals for the group task. That is, goals that were given to them by the experimenter. Instructions to participants in the participative goal-setting condition were that they were asked to determine specific group goals through group discussion.

The observers were student assistants who were blind to the hypotheses and volunteered to participate. Immediately after the second measurement and before the third and last measurement of the brainstorming task, the main questionnaire was distributed. That is, the questionnaire measuring feedback and goal-setting. After the third measurement, the same questionnaire was used again. Further team cooperation, the possibility of team cooperation in the future, was measured with three post-experiment items (e.g. "I can imagine solving more problems with this group"). Again, following a procedure used by Wegge and Haslam (2005), performance improvement was the difference between first and second brainstorming session. Group performance was measured by the total number of unique uses of different items.

Thus, all measurements except for demographic data were distributed both before and after the experimental manipulation.

Results

Descriptive statistics are shown in table 1 and table 2. The dependent measures have Cronbach´s Alphas ranging from .61 to .72 and the within-group variance was from .29 to 1.6, and the Rwg index ranged from .49 to .93.

Observed correlations

Group cohesion correlated negatively with group identification and performance improvement.

Social compensation correlated positively with intrinsic motivation and further team cooperation. Group goal commitment correlated with social compensation, intrinsic motivation and values of group success and values of group failure.

Also, there were positive correlations between values of group success and values of group failure, and between group identification and performance improvement.

Table 1. **Alpha reliabilites (in bold), average within-group variances (v), average within-group agreement (Rwg), group means (M), standard deviation (SD) and intercorrelations.**

	Variable	*V*	*Rwg*	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1.	Group goal commitment	0.29	0.93	2.1	0.09	**.64**								
2.	Group cohesion	0.41	0.81	2.4	0.2	.16	**.62**							
3.	Group identification	0.33	0.78	2.1	0.14	.02	-.85**	**.69**						
4.	Social compensation	0.34	0.73	2.4	0.14	.51**	.29	-.19	**.72**					
5.	Intrinsic motivation	0.51	0.65	1.9	0.1	.47**	.20	-.27	.48**	**.61**				
6.	Expect no free-riding	0.41	0.71	1.7	0.06	.14	.19	.24	-.17	.006	**.61**			
7.	Value of group success	1.4	0.51	2.2	0.4	.52*	.18	.03	.33	.31	.-.10	-		
8.	Value of group failure	1.6	0.49	1.1	0.5	.42*	.12	-.04	.21	.23	-.08	.62**	-	
9.	Further team cooperation	0.43	0.78	1.9	0.1	.19	.11	-.23	.20	.55**	.13	.22	.18	**.63**
10.	Performance improvement	-	-	8.5	2.6	.21	-.43*	.44*	.21	.15	.009	.19	.21	.05

Notes: analysis is based on group level data of 30 five-person groups, *p<.05, ** p<.01

Performance of intact groups was examined. Theoretical reasons for preferring the team-level analysis has been presented by, for example, Hackman and Wageman (2005) and Klein and Kozlowski (2000). To test mean differences across the 3x2 experimental conditions MANOVAs were used. Mean values that underlie the hypotheses testing are presented in Table 2.

The first hypothesis (1.a) stated that group goal-setting instructions will increase idea-generating performance as compared to control instruction. This hypothesis was supported. Tukey B analyses showed that both directive goal-setting and participative goal-setting affected performance positively as compared to no goal-setting condition.

Hypothesis 1.b); group goal-setting instructions decrease motivation losses (expect no free-riding) was not supported.

Hypothesis 1.c); group goal-setting instructions increase motivation gain (goal commitment, social compensation, group cohesion, group identification, intrinsic work motivation, further team cooperation) was only partly supported. Regarding perceived participation, the participative goal condition was different from both no goal-setting and directive goal-setting conditions. Regarding goal commitment, participative goal condition was different from no goal-setting condition. In both cases higher values for participative goals compared to the other types of goal setting.

Table 2. **Means and standard deviations of the differences between second and first measurements across the two independent factors (goal setting and feedback).**

	Goal setting									*feedback*								
Variable	*No*		*Directive*		*Participative*		*F*	*df*	*Sig.*	*No*		*Yes*		*F*	*df*	*Sig.*		
	n=10		*n=10*		*n=10*					*n=15*		*n=15*						
1. Group goal commitment	M .02	SD 05	M .04	SD .06	M .11	SD .15	6.64	2,24	.005	M .02	SD .04	M .10	SD .13	9.67	1,24	.005		
2. Perceived participation	M .02	SD 06	M .01	SD .03	M .09	SD .10	7.79	2,24	.002	M .01	SD .05	M .07	SD .09	9.43	1,24	.005		
3. Group cohesion	M .01	SD .03	M .02	SD .06	M .05	SD .04	0.03	2,24	N.S.	M .01	SD .05	M .02	SD .04	0.74	1,24	N.S.		
4. Group identification	M .01	SD .01	M .01	SD .01	M .01	SD .03	8.44	2,24	.002	M .02	SD .03	M .02	SD .04	0.28	1,24	N.S.		
5. Social compensation	M .02	SD .05	M .01	SD .01	M .04	SD .08	1.87	2,24	N.S.	M .01	SD .04	M .03	SD .07	0.98	1,24	N.S.		
6. Intrinsic motivation	M .09	SD .09	M .03	SD .05	M .09	SD .08	2.81	2,24	N.S.	M .04	SD .06	M .10	SD .08	7.37	1,24	.012		
7. Expect no free-riding	M .13	SD .08	M .05	SD .07	M .13	SD .12	2.34	2,24	N.S.	M .10	SD .10	M .11	SD .10	0.30	1,24	N.S.		
8. Further team cooperation	M .08	SD .08	M .06	SD .07	M .10	SD .09	0.79	2,24	N.S.	M .07	SD .07	M .09	SD .08	0.61	1,24	N.S.		
9. Performance improvement	M 6.4	SD 2.4	M 8.6	SD 1.7	M 10.6	SD 1.8	7.16	2,24	.003	M 8.5	SD 3.3	M 8.6	SD 1.8	0.22	1,24	N.S.		

Notes: MANOVA analysis is based on group level data of 30 five-person groups.

Hypotheses 2.a); feedback will increase idea-generating performance as compared to control instruction was not supported.

2. b) Feedback will decrease motivation losses was not supported.

2. c) Feedback will increase motivation gain was only partly supported. Participants receiving feedback reported higher intrinsic motivation than participants not receiving any feedback.

3. There will be interaction effects between goal-setting and feedback.

There were interaction effects between goal-setting and feedback regarding performance (F (2, 24) 4.46, p = .02), goal commitment (F (2, 24) 5.53, p = .01), and team cohesion (F (2, 24) 4.34, p = .02). The interaction effect showed that participants receiving feedback was affected less by goal-setting. Participants not receiving feedback showed a larger increase in performance as an effect of the goal-setting manipulation than did participants receiving feedback. The opposite pattern was shown for goal commitment. That is, feedback and goal-setting jointly increased goal commitment. The third interaction effect was that the group that received feedback and directive goal-setting reported highest group cohesion while the no feedback and directive goal-setting reported lowest group cohesion.

Thus, goal-setting affected performance but feedback did not. Goal-setting increased motivation gain more than feedback and neither manipulation affected motivation losses. Participative goal-setting affected the dependent variables more than directive goal-setting.

Discussion

The purpose of this study was to examine the joint effects of goal-setting and feedback on brainstorming performance. Results were generally supportive to the experimental design. First, goal-setting clearly affected group performance and goal commitment. Secondly there were interaction effects between feedback and goal-setting for these two dependent variables.

The result that feedback in combination with participative goal-setting had a beneficial effect on goal commitment is important for future development of goal-setting theory. To our knowledge this is a new finding.

Some of the results were surprising: group cohesion correlated negatively with group identification and performance improvement. However, there is a plausible common sense explanation to the cohesion – performance relation. It is possible that groups with high social cohesion are less task focused, which in turn can affect performance negatively. The negative correlation between cohesion and group identification is more puzzling. Perhaps group identification is based on personal perceptions of experiences with the group and group cohesion more on satisfaction with the group.

Results from other studies point in the same direction as the findings here, that goal-setting affects performance more than feedback (Deshon et al, 2004), and that participative goal-setting affects performance more than directive goal-setting (Wegge & Haslam, 2005).

One limitation in the study was that the sample was skewed in terms of gender and country. The statistical power did not permit adequate testing of the cultural heterogeneity but the randomly-assigned participants were equally matched over the different experimental conditions.

Still, the research is important since no other studies have been conducted that investigate the joint effect of feedback and goal-setting with the dependent variables used in this study. Future directions for this research is both about replicating the findings in laboratory settings across different samples and to investigate the two independent factors (goal-setting and feedback) in studies on real life work groups.

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The Influence of Safe Driving Public Service Announcements on Young Adults' Risk Evaluation Depending on their Sensation Seeking Level

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The aim of the study was to examine how the risk evaluation of high sensation seekers changes if they watch public service announcements with different levels of message sensation value. The hypothesis was that high sensation seekers would evaluate risk as greater after watching the safe driving public service announcements with high message sensation value in comparison with low message sensation value (MSV). There were 103 participants in the experiment (27 male, 76 female), who were divided in 3 groups – 1) control group with no announcements, 2) first experimental group with announcements of low MSV, 3) second experimental group with announcements of high MSV. Simple regression analysis did not confirm the hypothesis. In fact it showed the opposite tendency that was statistically significant – high sensation seekers after watching announcements with high MSV evaluated the risk level even lower, in comparison with announcements with low MSV. The results suggest that safe driving public service announcements do not have the desired impact on high sensation seekers – high MSV announcements do not increase their perceived level of a dangerous situation's riskiness.

Key words: sensation seeking, message sensation value, risk evaluation, risky driving

Introduction

Sensation Seeking

Zuckerman (2007) has shown that high sensation seekers (usually defined as those above median) significantly differ from low sensation seekers in their emotional and physiological reaction to and enjoyment of stimulation and experience that has high sensation and/ or risk potential. Zuckerman defines sensation seeking as: "the need for varied, novel, and complex sensations and experiences and the willingness to take physical and social risks for the sake of such experience." (Zuckerman, 2007, p. 49). The Sensation Seeking Scale includes 4 subscales: 1. The thrill and adventure seeking (TAS) measures the respondents' desire to engage in risky- and adventurous sports or activities, often seeking unusual sensations, 2. The experience seeking (ES) subscale measures the tendency to search for stimulation through the mind, senses, art, travel and even mind-altering drugs. It is often characterized by the desire to associate with unconventional people. 3. The feelings of disinhibition (DIS) subscale measures attitudes of impulsion and extraversion. Frequently feelings of disinhibition are characterized by seeking of sensations through alcohol consumption, gambling, sexual variety, etc. 4. The boredom susceptibility (BS) items represent the subjects' aversion to repetitive experiences or work. (Harris, 1995). The scale is widely used all over the world. High sensation seekers

tend to risk more, to come up with more creative ideas and solutions, and to take a lead role in interpersonal relationships (Kopeikin, 1997; Zuckerman & Kuhlman, 2000).

It is common that high scores on sensation seeking are associated with various kinds of antisocial behavior. For example, there are many studies which have been conducted in different populations, cultures and age groups that show close to moderate correlations between sensation seeking, and alcohol consumption and smoking (Kraft & Rise, 1994), as well as between sensation seeking and drug use (Kopeikin, 1997). There is a correlation between sensation seeking and unprotected sex (Donohew, Zimmerman, Cupp, Novak, & Colon, 2000) and between sensation seeking and preference for frightening and violent videos (Hoffner & Levine, 2005). Finally, there is a positive correlation between sensation seeking and reckless driving (Steinberg, 2007). These results allow to conclude that high sensation seekers are a potential risk group in terms of violation of laws and health-threatening behavior.

It appears that high sensation seekers do not search for risk per se, but still, high sensation seekers do engage more frequently in risk related activities than low sensation seekers. Zuckerman explains it as follows: "Their risk propensity makes them blind about real risk evaluation" (Zuckerman, 2007, p. 67). In other words, high sensation seekers do not seek for the risk itself, they seek for sensations that can be achieved through the risky activity. High sensation seekers evaluate these activities as less risky than their low sensation-seeking counterparts do. This means that people who differ on sensation seeking, also differ on the activity's risk evaluation – the dependent variable of the current research.

Message Sensation Value

It is believed that sensation seeking is influenced by on the dynamics of the neural system – high sensation seekers have a higher optimal level of arousal. That is why they are more responsive to loud, bright, dynamic and creative visual and audial stimuli. Research by Helme and colleagues (Helme, Donohew, Baier, & Zittleman, 2007) shows that graphic, fast moving and otherwise dynamic scenes are more effective with adolescent smokers who score high on the sensation seeking scale, whereas visually and audially unsaturated anti-smoking campaigns are more effective with low sensation seekers.

Such campaigns in general can be divided into two groups: 1) those with high message sensation value (MSV) and 2) with low MSV. Message features forming high MSV are as follows: novel, dramatic, graphic, stimulating, inconceivable and explicit. These features trigger the message recipient's emotions and the emerging effect is accordant with the sensation seeking level (Palmgreen, Stephenson, Everett, Baseheart, & Francies, 2002).

MSV represents the "level, to which the formal or structural aspects and content of the audiovisual features stimulate sensory, affective and arousal reactions" (Palmgreen, Donohew, Lorch, Rogus, Helm, & Grant 1991, 219). There is a positive correlation between MSV and perceived MSV (Morgan, Palmgreen, Stephenson, Hoyle, & Lorch 2003). It is of great importance, for example, for the organizations that create public service announcements (PSA) – they have to understand the potential

audience – whether they have to create message as highly stimulating or less stimulating in order to achieve the needed effect.

In previous research the analysis of sensation seeking and MSV has been based on two theoretical models (Morgan et al., 2003): information activation model (Donohew, Palmgreen, & Duncan, 1980), and information processing capacity model (Lang, 1990; Lang & Dhillon, 1995; Lang, Newhagen, & Reeves, 1996; Thorson & Lang, 1992).

The information activation model proposes that attention is based on one's stimulation level. It states that a) every person has his/ her own optimal level of arousal that makes him/ her feel comfortable and b) when paying attention to a message one expects that his/ her optimal level of arousal will be reached. If it is not reached, he/ she usually turns away and searches for another source (Morgan et al., 2003).

Studies within the information activation model have shown that (1) high sensation seekers need more complex and novel messages to grab their attention, and (2) high MSV messages, while grabbing the attention of high sensation seekers, will simultaneously influence their intentions, attitudes and even behavior with greater probability (Palmgreen, Donohew, Lorch, Hoyle, & Stephenson, 2001). Experiments show that high MSV messages promote greater attention and behavioral change particularly in high sensation seekers, whereas low MSV messages have the same effect on the low sensation seeking audience (Helme et al., 2007; Lorch, Palmgreen, Donohew, Helm, Baer, & D'Silva, 1994; Palmgreen et al., 1991).

The second model – information processing capacity model – explains that every individual has a limited capacity of information processing. TV viewers have limited cognitive ability to select, encode, store and retrieve the information from the scenes seen on TV. In the previous model, selective attention is a result of the individual's need for stimulation. In the present model, attention is a function of conscious and unconscious decision making. People can consciously control the amount of attention to specific stimuli, if it is necessary for a particular purpose, whereas the message's structural and content features often trigger automatic (unconscious) attentional processes (Morgan et al., 2003).

From the social advertising point of view, it is important to acknowledge the fact that high sensation seekers consistently prefer messages that match their need for novel, unusual and intense sensations (Palmgreen et al., 1991), in other words – they prefer high MSV messages.

In the studies reviewed above, PSAs aimed at reduction of smoking and marihuana use were studied. For example, in Palmgreen's and colleagues' research (Palmgreen et al., 2001) the target audience (adolescents from two cities) were interviewed before, after and during a televised anti-marihuana campaign. The campaign consisted of high message sensation value PSAs. The behavioral change of adolescents was measured by registering the actual amount of marihuana use. The results showed that marihuana use decreased by 27-38% (depending on the geographical area). These results show the effectiveness of high MSV campaigns. In a recent meta-analysis (Phillips, Ulleberg, & Vaa, in press) of 67 studies, the weighted mean effect of safe driving PSAs on the decrease of road accidents was 9%. It is believed that showing negative consequences of an activity leads to a decrease of the unwanted behavior. It can be clearly seen in

the recent safe driving campaigns – they have become more and more aggressive in stressing the risks and negative consequences of speeding, not wearing seatbelts, or being distracted while driving. However, in contrast to the previous study in which the effectiveness of the anti-smoking campaign was shown, Rosenbloom (2003), while studying the effect of a specially created frightening movie on youth's willingness to speed over the limit, concluded that high sensation seekers become even more willing to speed after watching this movie The results are similar to what authors found in the current study.

Of course, in real life not only the contents of the PSA are important. The context into which the PSA is embedded is important as well, for example, the movie or entertainment channel, news program etc., within which the PSA will be transmitted. This context also has to meet the needs of the target audience – the high sensation seekers.

Risk, Evaluation of Risk, and Risky Driving

In the risk related literature most definitions of risk include two concepts: probability and consequences. For example, risk is a "relatively high harm/ loss probability as consequences of an activity" (Roberts, 2010, 17). The consequences are understood as being primarily negative. People evaluate risk differently, for example, students underestimate the annual death rate caused by smoking, alcohol consumption and road accidents, but overestimate the injury rate caused by engaging in risky sports (Slovic, Fischoff, & Lichtenstein, 2000).

Zuckerman concludes that "individuals with lower levels of sensation seeking evaluate risk higher than individuals with higher sensation seeking level; individuals with higher levels of sensation seeking engage in risk taking activities more often" (Zuckerman, 2007, 58). In other words, individuals with higher sensation seeking level engage in risk-taking more frequently, and at the same time evaluate risk lower.

Risk evaluation is an important predictor of behavior. As stated before, risk evaluation negatively correlates with sensation seeking. But what is even more important – the correlation remains the same even if a high sensation seeker had never engaged in a particular risky activity (Zuckerman, 2007). It means that even in hypothetical situations high sensation seekers evaluate risk lower than their low sensation-seeking counterparts. It is worth mentioning that sensation seeking correlates with risk taking in different risk domains (financial, health, etc.), and it is true for children, adolescents and adults (Zuckerman, 2007).

In general, people evaluate road-related risks as relatively high in risk, just below risks concerning smoking, alcohol consumption and drug use; but they also evaluate the probability of positive outcome of risky driving as relatively high (Zuckerman, 2007). Speed and reckless driving are intense stimuli, which stimulate higher dopamine excretion in the brain areas responsible for reinforcement in high sensation seekers. At the same time, in low sensation seekers the same stimuli – such as speed or reckless driving – stimulate higher excretion of noradrenaline and serotonin, which are responsible for anxiety. Thus, the same stimulus may have very different effects – it reinforces the willingness to repeat the action in high sensation seekers and suspends

the willingness to repeat in low sensation seekers. It is worth to mention that speed is a goal in itself for high sensation seeking drivers; in order to reach this goal they, for example, change lanes frequently and tailgate (Zuckerman, 2007). According to Road Traffic Safety Department web page (www.csdd.lv), one third of all road accidents in Latvia are caused by speeding, and this traffic rule violation is most common for 18 – 30 year olds. It is the age when sensation seeking is at its peak (Zuckerman, 2007).

In order to prevent risky driving PSAs are created and transmitted through media. Even thought the number of car accidents in Latvia in the first quarter of 2011 has declined (compared to the same period of 2010), it is not clear what is the role of PSAs in such a decline, and to what extent it can be explained by other measures such as more stringent policing, increased fines for traffic violations, or installing speed cameras. At the same time, in the first quarter of 2011, compared to the same period of 2010, the number of those injured in car accidents has increased (11,3%) and the number of drivers under the influence of alcohol and drugs has also increased. It is obvious that the effectiveness of safe driving PSAs is one area of traffic psychology that requires more research.

The aim of the current study is to investigate the effectiveness of safe driving PSAs. More specifically, the research question addressed is the following: to what extent will the match between sensation seeking level and MSV level of safe driving PSAs increase the level of risk evaluation among the participants? Previous research has shown that high sensation seekers prefer stimuli (including videos) with high MSV (i.e., creative, intense, emotional etc.). When creating safe driving PSAs, one must think of such visual and content features that meet the need for stimulation of high sensation seekers, because they are the target audience and potential violators.

The current study tests the following hypothesis: Young adults with high level of sensation seeking will evaluate risk as greater after watching public service announcements with high sensation value (compared to public service announcements with low sensation value).

Method

Pilot Study

The aim of the pilot study was to create two blocks of safe driving PSAs – one with 3 high MSV PSAs and one with 3 low MSV PSAs.

An expert group (the first author of the study and two other research psychologists) chose ten safe driving PSAs out of a wider pool of videos and then met for a final discussion to select the final six, that would best match the purpose of the study. The expert group evaluated PSA's message sensation value using the "Message Sensation Value (MSV) Scheme" (Morgan, Palmgreen, Stephenson, Hoyle, & Lorch, 2003). The PSAs had to satisfy the following criteria to be selected: a) they had to be in English, with verbal message not being the main source of information, b) the video could be clearly projected on a wide screen, with clear sound, and c) the length of each PSA had to be approximately 1 minute. In addition, in both blocks of PSAs there were both male and female actors, and the same safe driving themes were presented: negative

effects on drunk driving, seat-belt neglect, distracted driving and speeding (an example description of the contents of a PSA used is given in Appendix 1). It was decided to have all PSAs in English, because in Latvian language there was not enough variety in PSAs that would meet the above mentioned criteria. Thus, only those videos were included where the verbal message (voiceover or written) was not the main source of information, and where it had the least impact on the understanding of the PSA.

The second phase of the pilot study was conducted to ensure that the six chosen PSAs were properly divided into low and high MSV groups. Thirteen psychology students evaluated the 6 PSAs during their regular research methodology lectures in the following order: low message stimulation value (LMSV), high message stimulation value (HMSV), LMSV, HMSV, LMSV, HMSV. Respondents were warned that video material may contain unpleasant scenes so they could choose not to participate. Two students chose that option. After each PSA, students had to evaluate it using the "Perceived Message Sensation Value (PMSV) Scheme" (Palmgreen, Stephenson, Everett, Baseheart, & Francies, 2002).

To check whether there were statistically significant differences between the two groups of safe driving PSAs, General Linear Model (UNIANOVA) was used to test the differences in PSA evaluations. The results showed that there were statistically significant differences between the two groups $F(1, 25) = 46{,}16$, $p < 0{,}01$. Thus, the PSAs that were considered by the expert group to be of low MSV were rated by students as being of lower message sensation value ($M = 3.98$, $SD = 1.22$) than the PSAs which were initially selected by experts as being of high MSV ($M = 5.51$, $SD = 0.73$).

Sample of the Experiment

One hundred and three university students (76 women, 27 men, $M_{age} = 23.18$ years, $SD = 5.20$) took part in the experiment. Students were recruited during their regular lectures on research methodology or social psychology (as part of the lecture course). They received course credit for the participation. All participants were randomly divided into 3 groups: low MSV group (8 men, 28 women, $M_{age} = 23.42$, $SD = 5.64$), high MSV group (14 men, 23 women, $M_{age} = 23.59$, $SD = 5.71$), and control group (5 men, 25 women, M_{age} 22.40, $SD = 3.93$).

Out of the 103 participants, 50 participants had a driving license; 66% of those with licenses had driving experience of two or more years. In the low MSV group 20 participants had a driving license, in the high MSV group – 18 participants, and in the control group – 13 participants had a license.

Measures

The participants first provided demographic data, indicating their gender, age, whether they had a driving license, and their driving experience (less than 2 years or more than 2 years). After the demographic data, all participants completed the "Brief Sensation Seeking Scale (BSSS)" (Stephenson, Hoyle, Palmgreen, & Slater, 2003). After completing the BSSS, participants in both experimental groups watched the PSAs, and then completed a distraction task – "Time Perspective Survey" (Kolesovs, 2010). In the control group, the distraction task was completed right after completing the BSSS. The

distraction task consists of eight items. Every item had to be rated on a 5-point scale ranging. For items measure orientation towards future, for example, "I complete my tasks on time" and for items measure orientation towards present, for example, "I live only in the current moment".

The last survey that the participants completed was the "Risk Level Evaluation Survey" (see Appendix). The survey was designed by Dana Frolova, the first author of the current study. The survey was designed in order to measure the perceived level of a given situation's riskiness. It was necessary to measure exactly the road related situations that are similar to those shown in the videos. The new measure was designed so that it included both specific road related situations and a few other regulatory violations in order to make the survey purpose less obvious for the participants. The survey consists of 13 items, each describing one risky and/or regulation-violating behavior occurring in day-to-day life. Every item had to be rated on a 10-point scale ranging from 1 – not risky at all, and 10 – extremely risky. The first item was given as an example. The last, thirteenth item in the list was included as a neutral relief. Both of these items (the first and the last) were not used in calculating the results; the other 11 items were included in the analysis. The described behaviors included both road safety violations and other regulatory violations in order to lessen social desirability and to avoid automatic answers.

Procedure

The random assignment of participants to the experimental groups was done using previously prepared cards with numbers from 1 to 3; the sequence of numbers was determined using a random number generator. The groups (one at a time) were asked to move to another room where the experiment took place. In this room the participants in the control condition filled in the demographic data and then the three surveys, but the participants in both experimental conditions filled in the demographic data, then the first survey, then they watched the videos (either low or high MSV PSAs), and then they completed the last two surveys. The control group was the first one to take part in the experiment. The videos (3 PSAs in each experimental groups) were projected on the wall, making sure that in both experimental conditions the volume of sound was the same.

Results

First, the internal reliability of the three surveys was calculated, and the following Cronbach's Alpha were found: Perceived Message Sensation Value Scheme (used in pilot study) $\alpha = 0.80$; Brief Sensation Seeking Scale $\alpha = 0.79$; Risk Level Evaluation Survey $\alpha = 0.83$.

Before the hypothesis testing, it was necessary to check which items in the Risk Level Evaluation Survey load on the same factor. A principal component analysis with Varimax rotation showed that 7 out of 11 activities were loaded on the same factor. These 7 items were included in the further analysis. These items were: 1) To ride a scooter without a helmet, 2) To drive a car without a seat-belt fastened, 3) To overtake a car without showing a turning signal, 4) To write a text message while driving, 5) To

ride a motorbike on the highway with the speed of 30 and more km/h above the speed limit, 6) To ride a jet ski without a life vest, 7) To drive a car after drinking a glass of wine.

To test the hypothesis that young adults with high level of sensation seeking will evaluate risk as greater after watching PSAs with high MSV if compared to PSAs with low MSV, a simple regression analysis was performed. The regression analysis yielded a statistically significant model, $R^2 = 0.12$, $F\ (5, 97) = 2.70$, $p < 0.05$. A statistically significant negative effect of the interaction term between sensation seeking and MSV could be observed, $\beta = -1.10$, $p < 0.05$. In the high MSV condition, a negative relationship between sensation seeking and risk evaluation appears (see Table 1).

Table 1. **OLS regression analysis with sensation seeking and PSA MSV levels as predictors and the perceived risk level as the dependent variable.**

Variables	***B***	***β***	***p***	***R²***
Constant	47,28		0,000	0,12
Sensation seeking	0,10	0,06	0,782	
Dummy for low sensation value PSA	14,13	0,60	0,291	
Dummy for high sensation value PSA	28,26	1,20	0,024*	
Sensation seeking and high sensation value PSA interaction	-0,94	-1,10	0,041*	
Sensation seeking and low sensation value PSA interaction	-0,34	-0,43	0,472	

*p<0,05

Thus, the hypothesis was not confirmed – high sensation seekers after watching high MSV PSAs did not evaluate the given activities as more risky. On the contrary – high sensation seekers, after watching high MSV PSAs, evaluated the given activities as even less risky. Thus, it can be concluded that the match of sensation seeking with MSV had an opposite effect on participants' subjective risk perception. Intense, dramatic PSAs with vivid representations of negative consequences of road safety violations backfired with a decrease in the extent to which the participants evaluated the given activities as risky.

Discussion

From the theory one should assume that the match of sensation seeking level with the MSV level (high + high or low + low) while grabbing and holding viewers' attention increases the effectiveness of changing their attitudes and intentions (Morgan, Palmgreen, Stephenson, Hoyle, & Lorch, 2003). Taking into account that PSAs present negative consequences of socially undesirable behavior, the match of sensation seeking level with the MSV level should increase the subjective perception of risk level (riskiness) of such behavior.

The results of the current study are not in line with this theoretical reasoning and suggest that the high sensation seekers may process the messages contained in the PSAs differently. The results show that high sensation seekers evaluate risk even lower when

exposed to high MSV PSAs. Thus, after viewing the announcement, high sensation seekers may be even more willing to perform a given activity, to behave in a particular way, because the particular activity may seem even less risky to them than it was before watching the video. There are two possible explanations for such a tendency. First, high sensation seekers might be "immune" to admonitions and warnings, because, it may be that they have already since childhood had a propensity for risky behavior, and since childhood had been warned not to engage in risky behavior. Perhaps they have become are "immune" to these kinds of messages while at the same time, displaying an oppositional "I know what you (researchers) want from me and I will not conform to your expectations" kind of attitude. Such a reaction could be triggered by the announcement's content, or by the experimental manipulation. In other words, high sensation seekers might be reacting negatively to the demands of the experimental situation.

The second possibility is that the perception of risk level does actually change, but in an unexpected direction. This may happen because of the announcements' features – their dramatic, intense content – that grab and hold the high sensation seekers' attention, but it does not mean that these messages automatically change the risk perception of the viewer. Some parallels can be drawn with horror films, action movies, or thrillers – previous research has shown that high sensation seekers prefer high-arousal films (Banerjee, Greene, Krcmar, Bagdasarov, & Ruginyte, 2008), and the more frightening they are, the better. It is worth mentioning that PSAs in the past five years have become somewhat like horror films, because their aim is to cause disgust or fear regarding the undesirable behaviors and their consequences. One may speculate that the saturated story and audial effects in high MSV PSAs simply stimulate the willingness of high sensation seekers to engage in risky behavior, because the arousal triggered by watching the announcement may lead to an overestimation of the pleasantness of the risky behaviors described in the survey (cf. Slovic, Finucane, Peters, & MacGregor, 2002; Slovic & Peters, 2006). Such interpretation of the findings is in line with some previous research. For example, Leshner (2009) found that commercials combining both fear and disgust were less effective than those focusing either on fear or disgust alone. In addition, Sudermann (2009) and Steinberg (2008) have doubted the usefulness of PSAs when those are targeted at high-risk groups, such as high sensation seeking youth, because the consideration of future consequences (one of the most common themes in PSAs for reducing negative behavior) might reduce impulsivity, but not sensation seeking and the related general propensity for risky behavior.

Sensation seeking is considered to be a personality trait that is difficult for an individual to control. Perhaps the best one can do is to teach drivers to recognize their risk-taking tendencies and their limited control over such tendencies, and to recognize risky behavior as it begins before it becomes dangerous. In addition, government intervention strategies might be even more effective in reducing road accidents than attempts to make drivers more informed and less impulsive. Such strategies might include, for example, rising the driving age, because sensation-seeking level decreases with age and is neurologically based (Zuckerman, 2007).

Limitations and implications for future research

One limitation of the current study was a lack of manipulation check in the main experiment. The perceived MSV of the public service announcements that had been measured in the pilot study was not repeatedly measured in the experiment in order to save time and not to exhaust the participants. This leaves some possibility than in the experimental sample the announcements might have been perceived differently.

Another limitation is that the PSAs in the current study were shown independently; they were not included in any video material, e.g., in a movie. This might have increased the "transparency" of the experiment and could have influenced the answers resulting in the above-mentioned oppositionality to the experimental demand among high sensation seekers. Such a procedure was also chosen to simplify the design of the experiment. Whereas embedding PSAs in some lengthier video material decreases the "transparency" of the experimental design. The sensation value of that material must also be analyzed, because it can weaken or strengthen the effect of the announcements. In future studies it would be useful to include the PSAs in movies or other video material, as well as to combine them with non-driving-related PSAs and commercials, in order to increase the external validity and minimize the "transparency" of the experiments.

Finally, only part of the sample had driving licenses, whereas the target audience of safe driving PSAs are active drivers. On the other hand, young people aged 18 to 30 are potential drivers even without licenses, and they are potential drivers in the future (after taking the driving test). In addition, the dependent variable in the current study was general risk perception, relevant both for drivers and non-drivers.

Future studies should focus both on the from and content of safe driving PSAs, and on the context into which such PSAs are displayed or embedded. The appropriateness of the form and content for specific target audiences should be of special interest. The present study clearly demonstrates that the match between the message sensation value and the sensation seeking level of the audience requires further research. It is important to check whether the current results can be replicated with other samples and different experimental stimuli. Another potentially interesting line of research is finding the most effective media channel for transmitting the safe driving public service announcements depending on their target audience. Future studies should also focus on actual behavioral change in the target audience rather than ratings of risky behaviors. From the practical point of view, the latter line of research would be the most useful, because behavioral change, is the objective of public media campaigns.

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Appendix 1

Example of a low message sensation value PSA for distracted driving

A lady is driving a car. Text appears on the screen "driving + passengers". A child in the lady's car says "Mom, Jack dropped his dinosaur", lady answers "I'll get it" and gets distracted from the road while searching for the toy. While being distracted she nearly crashes into a truck driving in front of her. A child screams "Mom!" Crash is avoided. The scene changes and another car is seen on the screen riding near the motorbike with the text "driving + changing CD". Car driver changes CD and nearly crashes into the motorbike. Crash is avoided, because the motorbike moves aside. Third scene is with the text "driving + SMS texting" and there is a voice in the background saying "it only takes a split second to lose your concentration". While the voice is speaking, one can see a girl driving a car and writing a text message. She crashes into the car driving in front of her. After that, the background gets dark and a text appears "distracted drivers are dangerous".

Example of a high message sensation value PSA for distracted driving

Three girls are driving in a car. The driver is searching for a contact in her mobile phone. She says she can't find the number. While searching for the number, she crashes into a car driving on the opposite side of the road. The crash is showed in slow motion. You can hear girls screaming. You can see airbag opening, girls getting injuries from the broken glass, there is blood in the video (scratches on girls' faces); everything is showed in details. When the car finally stops, the girls look at each other, but another car crashes into them from the left side. When the cars stop, the crash area is showed from different angles. Afterwards the girls are shown in close-up. There is blood on their faces. One of the girls looks at her friend, who doesn't move and whose eyes are closed, and starts screaming. She then looks at her other friend – who also does not move, whose eyes are shut and there are scratches on her face – and continues screaming till the end of the PSA.

Appendix 2

Risk evaluation survey

People sometimes see some risk in situations that contain uncertainty about what the outcome will be and for which there is the possibility of negative consequences. Riskiness is a very personal and intuitive notion.

✓ Please, evaluate the riskiness of each given activity in the 10 point scale, where 1 – not at all risky and 10 – extremely risky. Thank You!

Activity	Your evaluation
Example: To ride a bicycle	1 2 3 4 (5) 6 7 8 9 10
To ride a jet ski without a life vest	1 2 3 4 5 6 7 8 9 10
To drive a car in a populated area with the speed of 20 and more km/ h over the speed limit	1 2 3 4 5 6 7 8 9 10
To smoke in a prohibited area	1 2 3 4 5 6 7 8 9 10
To ride a scooter without a helmet	1 2 3 4 5 6 7 8 9 10
To drive a car without a seat-belt fastened	1 2 3 4 5 6 7 8 9 10
To overtake a car without showing a turning signal	1 2 3 4 5 6 7 8 9 10
To take a swim at night	1 2 3 4 5 6 7 8 9 10
To ride a motorbike on the highway with the speed of 30 and more km/h above the speed limit	1 2 3 4 5 6 7 8 9 10
To drive a car after drinking a glass of wine	1 2 3 4 5 6 7 8 9 10
To hitch-hike	1 2 3 4 5 6 7 8 9 10
To write text message while driving	1 2 3 4 5 6 7 8 9 10
To take an elevator to the 13th floor	1 2 3 4 5 6 7 8 9 10

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Combining Social Axioms with Basic Individual Values and Self-Reported Driving Behavior in Predicting Traffic Accidents

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The purpose of the current study was to investigate the relationship between socially embedded variables of social axioms, basic values, self-reported driving violations and traffic accidents. Participants (329 drivers) filled out several questionnaires measuring those variables. Results of the path analysis showed that social axioms and individual values did not predict the frequency of involvement into traffic accidents *per se*. They predicted the frequency of violations. Meanwhile the frequency of violations predicted the involvement into traffic accidents. Our analysis showed that violations act as a mediating variable between personality- related variables and involvement into traffic accidents.

Key words: social axioms**,** basic individual values, driving violations, traffic accidents

Introduction

According to the data of the Road Traffic Safety Directorate (Road Traffic Safety Department, 2010), the situation on the roads of Latvia is improving every year; however, from a global perspective, the number of traffic accidents remains large. In the time period between 2001 and 2009 the number of fatal accidents in Latvia decreased by 54%, this decrease constituted the best indicator in the European Union (CARE, 2010). Nevertheless, Latvia remains among the five countries in Europe with the highest number of traffic fatalities per ten thousand inhabitants (CARE, 2010). Despite the various road safety campaigns in the Latvia mass media, during 2011 in comparison to 2010, the number of injured in traffic accidents increased by 5.8% (Road Traffic Safety Department, 2012).

When analyzing the causes of traffic accidents, the most frequently discussed reasons are environmental conditions (the road surface, weather conditions), the condition of the vehicles, and the drivers themselves. Bad roads as well as bad weather conditions are often blamed for road traffic accidents, meanwhile, the research shows that the main cause of traffic accidents is the "human factor" (e.g., Dewar & Olson, 2002; Underwood, Chapman, Wright, & Crundall, 1997). "Human factor" could be understood in terms of inner psychological states (anger, anxiety), processes (cognitive information processing), personality factors (personality traits, locus of control, aggressiveness, sensation seeking, or optimism), demographic factors (gender, age), attitudes (towards risk, safety, road behavior).

Risky driving is understood as the violation of formal and informal rules (abusing other drivers, try to catch up to a driver who made you angry while driving, etc.). Risky driving does not always result in a traffic accident; nevertheless, it is a substantial

predictor of traffic accidents. The reasons why persons choose risky driving behavior are based on the psychological aspects of the already mentioned human factor. As for the human factor, studies show that risky driving and the violation of traffic rules significantly correlate with personality traits (e.g., Constantinou, Panayiotou, Konstantinou, Loutsiou-Ladd, & Kapardis, 2011; Dahlen & White, 2006; Fine, 1963; Jovanović, Lipovac, Stanojević, & Stanojević, 2011; Oltedal & Rundmo, 2006; Sümer, Lajunen, & Özkan, 2005;), locus of control (Gidron, Gal, & Desevilya, 2003; Holland, Geraghty, & Shah, 2010), anxiety (e.g., Moen, 2007; Shahar, 2009), aggressiveness (e.g., Dula, Geller, & Chumney, 2011; Lajunen & Parker, 2001), sensation seeking (e.g., Cestac Paran, & Delhomme, 2011; Jonah, 1997), as well as gender and age (e.g., Krahe, 2005; Rhodes & Pivik, 2011; Stradling & Parker, 1997). Studies of driving skills show that the majority of drivers consider themselves to be above average drivers, which leads researchers to the conclusion that humans have an illusory view of their own driving skills (Sundström, 2008). Risky driving depends more upon personality factors, attitudes and beliefs than on driving skills (Iversen 2004, Lajunen & Özkan, 2011).

To date the studies of driving behavior have not taken into account social axioms (Leung et al., 2002). Social axioms in this context of driving behavior have not been studied at all to date, and the role of values in relation to driving behavior has only been studied on a cultural (i.e. group) level (Özkan & Lajunen, 2007) and minimally on an individual level (Austers, Renge, & Muzikante, 2012; Muzikante & Renge, 2011).

Social axioms

"Social axioms are generalized beliefs about people, social groups, social institutions, the physical environment, or the spiritual world as well as about events and phenomena in the social world. These generalized beliefs are encoded in the form of an assertion about the relationship between two entities or concepts" (Leung et al., 2002, p. 289). Five types of social axioms have been identified. "Social Cynicism" is characterized as a negative assessment of human nature and social events (e.g. "Kind-hearted people are always suffering losses"). "Reward for Application" refers to the position that the investment of human resources will lead to positive outcomes (e.g. "Hard-working people will achieve more in the end"). "Social Complexity" reflects the view that there are multiple solutions to social issues, and that the outcome of events is uncertain (e.g. "One has to deal with matters according to specific circumstances"). "Fate Control" is a general belief that social events are influenced by impersonal, external forces (e.g. "Fate determines one's successes and failures"). "Spirituality" is a view that spiritual forces influence the human world and have a positive effect on social outcomes (e.g. "Religious people are more likely to maintain moral standards") (Leung et al., 2002). Leung had proposed that social axioms are good predictors of social behavior (Leung et al., 2002) and this was confirmed by studies (Bond et al., 2004).

Individual values

Since the 1970-ies personal values have been studied to determine their relationship with attitudes and behavior (Rokeach, 1973). The majority of values studies nowadays are based on Shalom Schwartz's theory of basic human values (Schwartz, 1992), and since its publication it has promoted hundreds of studies during the past two decades

(Schwartz et al., 2012). Schwartz (1992) defined values as transsituational goals varying in importance, which serve as guiding principles in the life of a person or group. Values are "the criteria people use to select and justify actions and to evaluate people (including the self)" (Schwartz, 1992, p. 1).

Individuals can differ significantly in the meaning they ascribe to each of the basic values, however, these values are organized into a coherent system which arises from the social and psychological conflict or congruity between values which people experience when making everyday decisions (see Figure 1) (Schwartz, 1992). Schwartz proposes the idea of the circular structure of values (see Figure 1), which is confirmed by research during the past years (Maio, Pakizeh, Cheung, & Rees, 2009; Pakizeh, Gebauer, & Maio, 2009). Studies have demonstrated that value types with similar motivational contents are located closer to each other in cognitive networks, whereas values with opposite or competitive motivational contents are placed further from each other (Pakizeh, Gebauer, & Maio, 2009). All ten value types can be divided into competing dimensions, which form two fundamental problems a person must solve (see Figure 1).

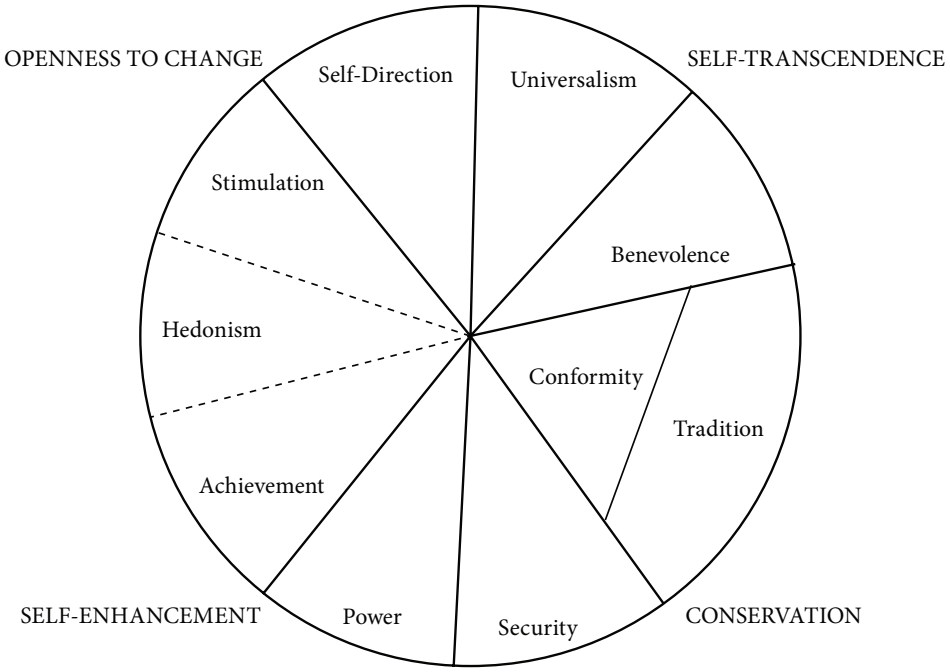

Figure 1. **Circular value structure. The values from the opposite sides of the circle are in conflict, while the adjacent values are similar in their contents and motivational goals (Schwartz, 1992).**

The first dimension "Openness to Change/Conservation" consists of stimulation, hedonism and self-direction versus security, traditions and conformity. The first three value types emphasize independence in actions, thoughts and feelings, readiness to experience something new, the last three – self-restriction, orderliness and resistance to change. The second dimension is "Self-Enhancement/Self-Transcendence" – power, hedonism and achievement versus universalism and benevolence. Here, the first three

values emphasize the realization of one's own interests, the last three – care about the interests and welfare of others. An action which is directed at fulfilling any of these values may have psychological, practical or social consequences, which may be in conflict or in accord with the fulfillment of another value (Schwartz, 1992). Conflict between the two concurrent values will be solved in favor to the personally most significant value at the given moment.

In 2012 Schwartz and colleagues (Schwartz et al., 2012) published a refined theory of basic values which is compatible with the original ten broad value constructs.

As opposed to attitudes, values are more stable and act as standards for actions (Schwartz, 2009). Based on this assumption values should predict behavior. Previous studies confirm that values can predict the choice of voters in elections (Caprara, Schwartz, Capanna, Vecchione, & Barbaranelli, 2006), everyday behavior (Bardi & Schwartz, 2003), the choice of a profession (Knafo & Sagiv, 2004), and consumers' choices (Verplanken, & Holland, 2002). Previous studies (e.g. Özkan, 2006; Őzkan & Lajunen, 2007; Gaygisiz, 2010) also report that cultural values correlate with traffic accidents and fatalities. Muzikante and Renge (2011) showed that values have predictive power in relation to driving violations.

Driving behavior

As stated before, the "human factor" is the main cause of traffic accidents (e.g., Dewar & Olson, 2002; Underwood, Chapman, Wright, & Crundall, 1997). The "human factor" is the cause of accidents not only on the road but also in aviation, marine, and other industries. Human errors could be very dangerous and with severe consequences in such industries as oil industry, nuclear power plants etc. These man-made causes of accidents suggest that aberrant behavior or in other words deviation from an adequate behavior path has taken place, and this requires distinction to be made between errors and violations (Reason et al., 1990). These two forms of aberration appear to have different psychological origins (Reason et al., 1990) however both are risky in any situation.

"The road environment makes an excellent natural laboratory for observing aberrant behaviors" (Reason et al., 1990, p.1315). Compared to accidents in industries and other transportation fields, traffic accidents cause the most fatalities – according to the World Health Organization traffic accidents will rise to become the fifth leading cause of death by 2030 with 2.4 million fatalities per year (WHO, 2009). Errors and violations are characterized by different psychological mechanisms. The conceptual boundary between errors and violations is not easy to draw, both can be presented within the same action sequence (Reason et al., 1990). But a driver can create a risky situation without intention to do so and that would be labeled as error. Errors are a result of failures in information processing, the cognitive functions of an individual, whereas violations are intentional aberrations from formal and/or informal rules, have a motivational component as well, and they are predominantly a social phenomenon. Violations of a particular type can be connected with certain accepted social norms, for example, speeding in order to adjust to the traffic flow, signaling to warn about the police, displaying a superior social status (Parker, Reason, Manstead & Stradling, 1995). Violations do not always refer to a violation of formal rules – these can be violations of

socially accepted norms. The main conceptual distinction between errors and violations lies in the intention of the driver.

Errors can be divided into two groups. First are lapses which are incidental behavioral deviations from an absolutely adequate norm of action, they relate to memory or attention failures. Second are behaviors which deviate from the appropriate way to reach an aim or which are the result of bad planning (Parker, Reason, Manstead & Stradling, 1995). Traffic psychologists show more interest in violations (than errors) since they are carried out intentionally, knowing that they are risky, despite the fact that it is not the aim of the violator to cause a traffic accident and to harm.

Self-report surveys are the most common way to study driver`s behavior and the most popular of them is Drivers Behaviour Questionnaire (DBQ) which was created in 1990 (Reason, Manstead, Stradling, Baxter & Campbell, 1990). Shorter version of DBQ with 24 items was created in 1995 by Parker and colleagues (Parker, Reason, Manstead, & Stradling 1995) and local versions of this are being used in several countries (e.g., Åberg & Rimmö, 1998; Obriot-Claudel & Gabaude, 2004). In each country there are small differences in the content of the survey items and the number of items because the situation in each country is different, and the contents of the items have been adjusted to specific conditions. Adaptations in different countries result in different factorial structure of the DBQ, starting from two to six factors compared to the original three-factor model (Åberg & Rimmö, 1998).

Overall the psychometric properties of the DBQ (internal consistency, test-retest reliability) are good (de Winter & Dodou, 2010). De Winter and Dodou (2010) in a meta-analysis showed that the DBQ is a good predictor of accidents, as well as that police records on speeding and distance following significantly correlate with DBQ ratings. The authors suggest that the DBQ is a prominent measurement scale which can be used to examine drivers' self-reported aberrant behavior (de Winter & Dodou, 2010). Discussion regarding the validity of the DBQ is ongoing (af Wåhlberg & Dorn; de Winter, Dodou, & Freeman, 2012), pros and cons of the method are well known and authors of the current study believe that at this moment there is no better cost-effective method for gathering information about driving behavior.

The present study

We aimed at discovering the relationship of social axioms and basic human values to risky driving behavior and traffic accidents. It has been shown that social axioms together with basic values may be successfully combined to predict behavior, namely, vocational choices, methods of conflict resolution, and coping styles (Bond et al., 2004). We were interested to test this relationship referring to risky driving and traffic accidents. This has never been done previously in regard to traffic psychology.

As seen in Figure 2, we made the following predictions concerning the associations of aberrant driving and accident rate based on social axioms and values. First, we predicted that the number of accidents will not be predicted by social axioms and values directly, those sets of variables will able to predict the degree to which driver violates the principles of safe driving. Social Cynicism social axioms as well as Self-Enhancement values were expected to be positively related to violations. Meanwhile, Fate-Control,

Reward of Application, and Spirituality social axioms and Conservation and Self-Transcendence values were expected to be negatively related to violations. Based on previous studies we were not able to formulate a specific prediction with respect to Social Flexibility social axioms and Openness to Change values. We predicted that social axioms and values will influence accident rate indirectly via violations.

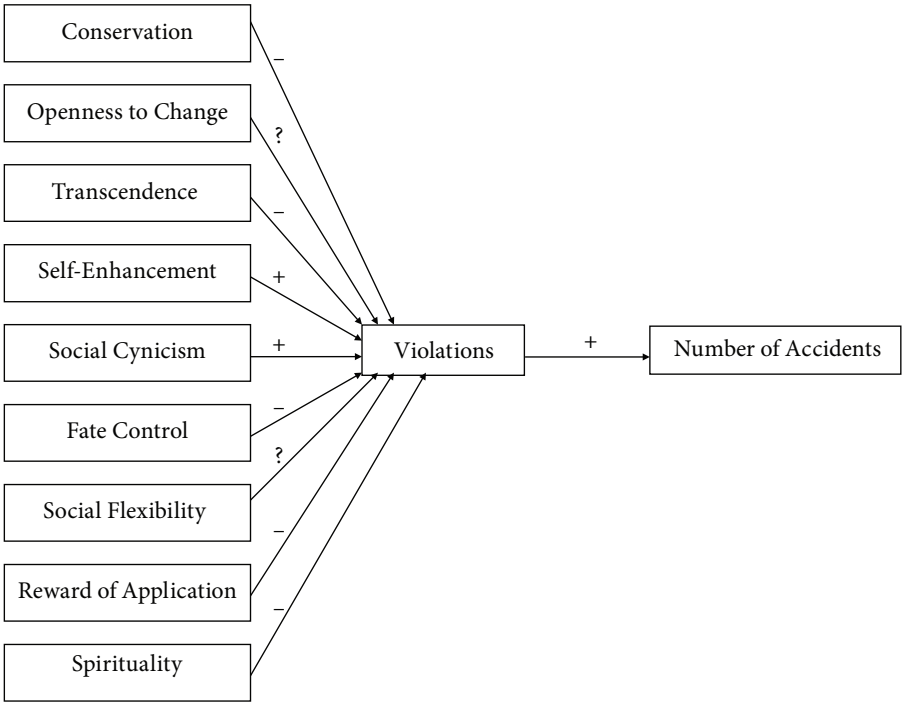

Figure 2. **Proposed model linking human values and social axioms to number of accidents via Violations.**

Method

Participants

A survey of 329 drivers was conducted. The mean age of the respondents was 30 years of age (*SD* = 7.34, age ranging from 18 to 65 years), 31.5% of them were females. All of the participants spoke fluent Latvian (an important issue, since the questionnaire was in Latvian).

Measures

Social Axioms. We assessed respondents' social axioms by a shortened version (21 items) of the Social Axioms Survey (Leung et al., 2002). The items with the highest factor loadings on each of the five social axioms factors were chosen (Leung et al., 2002). Respondents had to express their level of agreement with individual social axioms on a five-point scale (1 – not at all, 5 – completely). The reliability coefficients for five factors of social axioms were not particularly high (Cronbach's alpha = .42 for Social Flexibility,

.51 for Fate Control, .45 for Social Cynicism, .48 for Reward of Application, and .81 for Spirituality), but these can be considered reasonable considering the relatively small sample of the present study. Reliability coefficients of the original version of the method ranged from .53 to .79 (e.g. USA sample) (Leung et al., 2002).

Individual values. For the assessment of individual values the Latvian version of the Portrait Values Questionnaire (PVQ; Schwartz, Melech, Lehmann, Burgess, & Harris, 2001) was used. The questionnaire consists of the description of 21 imaginary persons. Each description characterizes the person's goals and desires, and this indirectly indicates the significance of certain value types. Respondents were asked to assess the similarity of themselves to the described person based on a six-point scale (1 – not at all, 6 – very similar). We computed four index variables corresponding to the four dimensions of the values system, namely, Self-Transcendence, Self-Enhancement, Openness to Change, and Conservation. The reliability of all the four indexes was relatively low (Cronbach's alphas ranged from .54 to .68), but also similarly relatively low in the original use of the questionnaire, commented upon by questionnaire author Schwartz that the alpha coefficients for this questionnaire are of necessity low (e.g. Roccas, Sagiv, Schwartz, & Knafo, 2002; Schwartz & Sagiv, 1995).

Risky driving. Latvian version of Drivers Behavior Questionnaire (DBQ) was created using items from the original (Reason, Manstead, Stradling, Baxter, & Campbell, 1990) and Swedish versions (Åberg & Rimmö, 1998). The questionnaire consists of 29 items related to different driving situations and respondents have to evaluate how frequently they behave as described (1 – never, 6 – nearly always). The reliability (measured by Cronbach's alpha) of the scales of DBQ was reasonably good: .79 for Violations, .69 for Errors, and .70 for Lapses. The respondents also were asked to indicate the frequency of involvement into road traffic accidents (during the last three years) and their gender and age.

Procedure

Data were collected in 2007 at Road Traffic Safety Department, a research assistant approached the participants and asked them to fill in the questionnaires. In addition we used an internet based version of the same questionnaire (posted at a portal dedicated to automobiles and driving) which was completed by 282 respondents. Initial analysis showed no difference between the samples. A data analysis was performed on a set of 324 questionnaires, since five questionnaires lacked significant amounts of information.

Results

Prior to examining our predictions regarding violations mediating role among social axioms, values and accidents, we conducted a factor analysis to ensure that the factor structure corresponds to the original. A three-factor structure was obtained by the procedure of principal component analysis with a varimax rotation. The factor structure (see Table 1) generally corresponds to the structure found in previous studies (see Åberg & Rimmö, 1998; Reason, Manstead, Stradling, Baxter & Campbell, 1990), yet there were few deviations from the commonly found pattern. The major difference was that the item 'Drink and drive' had high factor loadings with both factors of Lapses and

Errors. However, according to cross-cultural studies with the DBQ we may expect some variation in the factor structure (Özkan & Lajunen, 2007).

Table 1. **Three-factor solution for the DBQ items**

	Factors		
	Violations	***Lapses***	***Errors***
Overtake a car which is reducing speed	0.69		
Deliberately disregard the speed limits late at night	0.65		
Deliberately disregard the speed limits to align with traffic	0.65		
Illegal parking	0.63		
Increase speed when green is changing to yellow	0.62		
Get involved in unofficial "races" with other drivers	0.62		
Try to catch up a driver who made you angry	0.59		
Overtake on right on motorway	0.48		
Close follow	0.44		
Dislike other drivers	0.37		
Turning right, nearly hit cyclist	0.25		
Drive to destination and forget which way you got there		0.64	
Forget where you left your car in a car park		0.62	
Pass over traffic signs and get		0.62	
Intend to switch one device but by mistake switch another		0.60	
On usual route by mistake	0.30	0.50	
Get into wrong lane at roundabout		0.45	
Hit something when reversing		0.44	
When changing gear shift the wrong one		0.41	
Ignore "Give way" sign			0.57
Misjudge speed of oncoming vehicle			0.57
Fail to see pedestrians crossing			0.56
Maneuver without checking mirror			0.54
Try to overtake a car which is turning left			0.49
Misjudge road surface and it's slippery		0.32	0.47
Bothering other drivers by parking your car incorrectly	0.30		0.42
Queuing, nearly hit car in front		0.31	0.38
Drink and drive			0.34
Disregard traffic lights			0.22
Cronbach's alpha	**0.79**	**0.69**	**0.70**

Note: bolded items were used for computing the indexes of the respecting factors.

Correlations among the major variables (including demographics) are represented in Table 2. Age and gender significantly correlated with Violations, Lapses, and number accidents one has been involved in. Males were more prone to Violations and accidents, while women were more prone to Lapses. Age was related to accidents negatively. As one can see from Table 2, factors of social axioms and individual values correlate more

Table 2. **Intercorrelations, means, and standard deviations of major variables (N = 324)**

Variables	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
(1) Gender	1															
(2) Age	-0.05	1														
(3) Mileage (km)	0.33**	-0.08	1													
(4) Violations	0.35**	-0.20**	0.21**	1												
(5) Lapses	-0.16**	0.01	0.01	0.24**	1											
(6) Errors	0.05	-0.04	-0.04	0.36**	0.52**	1										
(7) Social Cynicism	0.14*	0.03	0.12*	0.18**	0.03	-0.01	1									
(8) Spirituality	-0.14*	0.03	0.05	-0.09	0.11*	0.09	0.12*	1								
(9) Fate Control	-0.12*	0.03	0.04	-0.08	0.05	0.04	0.11*	0.14**	1							
(10) Social Flexibility	0.02	0.01	-0.05	0.06	0.09	0.03	0.02	0.02	0.04	1						
(11) Reward of Application	0.00	0.13*	0.05	-0.02	-0.13*	-0.11*	0.17**	0.19**	0.15**	0.24**	1					
(12) Conservation	-0.18**	0.15**	-0.10	-0.26**	-0.04	-0.03	0.00	0.32**	0.06	-0.04	0.15**	1				
(13) Openness to Change	0.08	-0.20**	0.15**	0.19**	0.03	-0.01	0.03	-0.05	0.05	0.07	-0.06	-0.09	1			
(14) Self-Transcendence	-0.16**	0.17**	-0.10	-0.28**	-0.08	-0.06	-0.12*	0.14**	0.05	0.00	0.08	0.35**	0.18**	1		
(15) Self-Enhancement	0.00	-0.28**	0.04	0.25**	0.06	0.07	0.17**	-0.02	0.11*	0.07	0.03	0.02	0.58**	-0.02	1	
(16) Number of accidents	0.15**	-0.13*	0.06	0.11*	0.01	0.07	0.02	-0.06	-0.01	-0.03	-0.11*	-0.13*	0.04	-0.08	0.13*	1
M	1.69	29.82	27,298	2.89	1.93	1.72	3.25	2.77	2.73	4.17	3.9	4.03	4.26	4.42	4.12	0.27
SD	0.46	7.34	19,691	0.75	0.49	0.40	0.65	0.97	0.72	0.50	0.54	0.93	0.89	0.90	0.93	0.45

* $p < 0.05$, ** $p < 0.01$

often with Violations than accident rate (only social axioms of Reward of Application and Conservation and Self-Enhancement correlated with accident rate).

To test the proposed model of the relationship of social axioms and individual values to Violations and Drivers' Accident Rate we conducted a Path Analysis by a series of regression analysis. We conducted two regression analysis: at the first regression analysis we entered five axioms and four value dimensions as independent variables and Violations as dependent variable; in the second regression analysis Violations was independent variable and accident rate was dependent variable. Figure 3 illustrates all of the significant ($p < 0.05$) paths determined by the analysis. First, it is seen that there were two variables predicting Violations in a positive way, namely, Self-Enhancement values and Social Cynicism social axioms (standardized regression coefficients = .24 and .13, respectively). However, Conservation and Self-Transcendence values (standardized regression coefficients = –.20 and –.14), as well as Fate Control social axioms (standardized regression coefficient = –.10) predicted Violations negatively. These findings were in line with our predictions. On the other hand, Openness to Change values and social axioms Social Flexibility, Reward of Application, and Spirituality had no influence on Violations. Also, there were no direct influences of values and social axioms on number of accidents. However, as we predicted Violations predicted the number of accidents (standardized regression coefficient = .20).

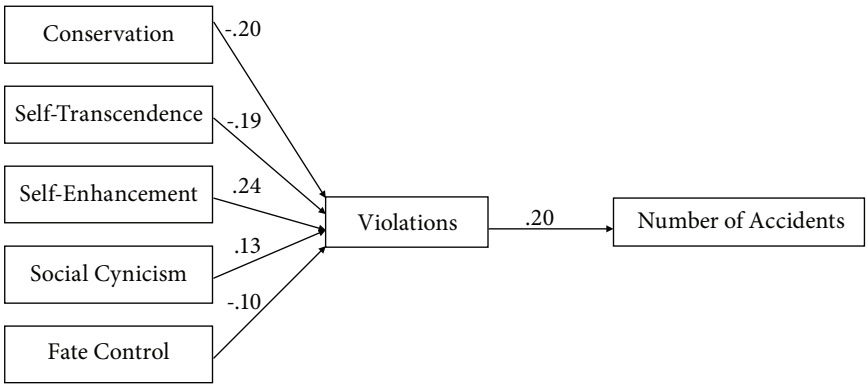

Figure 3. **Computed model linking human values and social axioms to number of accidents via Violations.** Coefficients are standardized regression weights. Two regression analysis were conducted: at the first regression analysis we entered five axioms and four value dimensions as independent variables and Violations as dependent variable; in the second regression analysis Violations was independent variable and accident rate was dependent variable.

Discussion

One of the first studies at the very beginning of traffic psychology research which related personality factors to risk of traffic accidents – the famous research about taxi drivers' – found that mild social deviance is related to involvement in the traffic accidents (Tillman & Hobbs, 1949, cited in Lawton, Parker, Stradling & Manstead, 1997). Due to this study the well-known expression: 'We drive as we live' was coined. Later studies had

confirmed this relationship (Lawton, Parker, Stradling & Manstead, 1997; Underwood, Chapman, Wright, & Crundall, 1997; West, Elander, & French, 1993). Social axioms and values influence our lives in many ways, and as we can conclude from the results of present research, they influence our driving style as well. Our hypotheses were supported to some extent. We found that Social Cynicism social axioms, Self-Enhancement values positively predict traffic security Violations. Fate Control social axioms, Conservation and Self-Transcendence values predicted traffic Violations negatively. Meanwhile the model did not show a direct influence of those variables to the accident rate. The only predictor of the accident rate was Violations, suggesting that Violations mediate the relationship between the culturally embedded variables and aberrant driving behavior.

The findings that Social Cynicism and Fate Control correlate with driving Violations is consistent with the results of previous research (Bond et al., 2004) where Social Cynicism and Fate Control correlate with wishful thinking as a coping strategy, and Social Cynicism also correlates with competition in conflict resolution. The same pattern may be seen in the relationship between the Self-Enhancement values and driving Violations. It has been found that Self-Enhancement values correlate with competition and wishful thinking (Bond et al., 2004). Wishful thinking is related with risky driving and traffic accidents (Kontogiannis, 2006) and competition is a relatively aggressive strategy for conflict resolution. Aggressiveness, in turn, is related to traffic accidents (e.g., Lajunen & Parker, 2001; Van Rooy, Rotton, & Burns, 2006). The negative relationship between Conservation values and traffic accidents corresponds to the results in a cross-cultural study where negative correlation between Conservation values and traffic safety had been found (Özkan & Lajunen, 2007).

Our results are inconsistent with previous study results to some extent. In the study by Bond and colleagues (2004) Openness to Change values were negatively related to wishful thinking, but in our study they have positive correlation with driving Violations. However, they did not appear as a significant independent variable in the final path analysis model. These results have been confirmed in recent studies (Muzikante & Renge, 2011).

All in all, the findings demonstrate that the idea of combining social axioms and values is fruitful in studying aberrant driving behavior. The data of the present study do not give a full understanding of the mechanisms underlying the demonstrated relationship and the role of Violations as a mediating variable. It is possible that studies so far have not considered the idea of value and presumably social axioms self-centrality (Verplanken & Holland, 2002) into the due account.

Limitations

It has to be noted that current study was performed in 2007 and the latest research (Mattsson, 2012) on factorial invariance of the DBQ shows that the factorial structure across different age groups and genders may vary. For future research with the DBQ it has to be taken into account that the factorial structure may not be stable across genders and age groups. Mattsson (2012) suggests that one way of improving DBQ would be not to concentrate on DBQ items but rather to consider recent theories of attention and human error and to update the theoretical structure and the instrument itself based on these considerations.

Also it has to be noted that self-report studies of driver`s behavior have been criticized lately (af Wåhlberg & Dorn, de Winter, Dodou, & Freeman, 2012). However, a self-report surveys are cost-effective and easy way to gather large samples and so called "objective" data from police records is not so "objective" after all (Lajunen & Özkan, 2011). Elander states that both self-report accident rate and official statistics are subject to systematic and random error (Elander et al., 1993). Results of the study of Boufous and colleagues (Boufous et al., 2010) show high level of accuracy in young drivers' self-report of police-recorded crashes and of police-recorded traffic offenses. Lajunen (2011) mentions that police accident records do not include minor damages. Results from another study (Arthur et al., 2005) demonstrate that there is no convergence between self-reports and archival data. However, self-report data includes a broader range of incidents than state records. Both recording methods have considerable strengths and short-comings (Lajunen & Özkan, 2011) and for more valid studies self-reports of accidents should be complemented with data from state records.

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Wise Female Students' Characteristics Evaluated by Themselves and Peers

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This study compared peer-evaluations and self-evaluations of female students who were nominated as wise; and self-evaluations by wise students and other students. The study consisted of three stages: 1) 226 students rated themselves on a "Personal Characteristics Checklist", constructed specifically for this study; 2) students nominated wise course-mates; and 3) randomly selected participants (n = 28) evaluated characteristics of a particular female student from the "wise" group, they were not told that the student was "wise". The mean of three peer-evaluations of each wise student was used for further analysis. Results indicate that wise female students' peer-evaluations emphasize cognitive properties (e.g., erudite, inquiring), whereas the wise female students' own self-ratings emphasize social characteristics (e.g., friendly, reliable).

Key words: wisdom; peer-evaluation; self-evaluation; youth

Introduction

In many cultures wisdom is perceived as important, and acquiring wisdom is related to an overall increase in the quality of life (Schwarz, 1992). Conceptions about wisdom and wise persons differ across various cultures (Maltby, Day & Macaskill, 2007). However, results of wisdom studies may also vary when different methods are used, for example, if laypersons' conceptions about wise persons are investigated (e.g., Ivanova & Raščevska, 2010); if self-evaluation tools (wisdom questionnaires) are used (e.g., Ardelt, 2003); or if special interviews are used to determine people's wisdom performance (e.g., Baltes & Smith, 2008). In previous studies there has been no attempt to directly compare peer-evaluations and self-evaluations of wise persons' characteristics, and it is the aim of the current study to do this.

How is a wise person characterized by wisdom researchers? Clayton and Birren (1980) defined wisdom as an integration of cognitive, affective and social personal qualities. They emphasized that it is crucial to function successfully in using one's intellectual abilities, to develop relationships socially, and to manage one's emotions. Sternberg (2003) stressed in his balance theory of wisdom that wisdom involves effective use of one's knowledge, and maintaining a balance between three aspects of intelligence – practical, creative and analytical. A wise person succeeds by balancing personal interests, the interests of others and the values of society, and by balancing between short-term and long-term gains in order to achieve the common good.

The Berlin group accentuated the role of experience and knowledge, also emphasizing an understanding of relativity within life situations (Baltes & Smith, 1990). According to this theory, wisdom can be fostered by several factors such as individual

cognitive abilities, specific erudition, age and others. There is still a question about whether persons considered wise are also gifted and creative, and vice versa. It can be argued that a person has to be creative, gifted and talented to a certain extent to gain wisdom, but it can also be argued that wisdom is necessary for "successful" intelligence (Sternberg, 1997), or "true" giftedness (e.g., Cropley, 1995).

When looking separately at aspects of wisdom in adolescence and young adulthood, fluid intelligence has to be considered as a part of wisdom. It is known that fluid intelligence is at a comparatively high level during youth, and provides the ability to grasp new knowledge, learn new skills and react effectively in unfamiliar situations (Cattel, 1971). However, results of traditional intelligence tests do not show if a person is highly creative and has a great creative potential (Cropley, 1996), neither do they indicate social skills or personal motivation to succeed in life. In addition, studies show that academic achievement only moderately correlates with success in later job life (Cohen, 1984). Wisdom in youth can be also characterized by different qualities from those in adulthood and old age. For example, Erikson states that one of the life tasks of young adults is to form relationships within society (Erikson, 1959). To summarize, youth wisdom should involve an integration of the ability to acquire new knowledge swiftly, and the ability to socialize successfully. Thus, it can be assumed that young people can also be defined as wise – especially when compared to average youngsters, or if we investigate those persons who are nominated as "wise" by their peers. In wisdom studies with youth samples, wisdom performance has been indeed related to empathy and social skills (Glück et al., 2005), and also ego-integrity, aspiration for self-development and introspection (Webster, 2009).

In implicit wisdom theory studies lay persons are usually asked to characterize a real or imaginary wise person, thus such studies indicate how wise people are perceived by others. Initial studies have shown that wise persons were thought to be knowledgeable, observant, tolerant, empathic, experienced, mature, and intuitive (Clayton and Birren, 1980). A study in Finland showed that wise persons listen to others, are friendly, are willing to help others, learn new things quickly, solve problems effectively, read a lot, and are sophisticated (Raty & Snellman, 1992). In Taiwan wise persons strive for the common good, help others, fulfill their ideas, are satisfied with life and can solve complicated problems (Yang, 2008). In a recent study in Latvia it was shown that wise persons have a high level of social and intrapersonal skills, erudition and cognitive abilities, problem solving and forecasting abilities, continuous inquiry, and professional competence (Ivanova & Raščevska, 2010).

Another way of studying wisdom involves the use of self-evaluation tools such as inventories, questionnaires and checklists. Based on such studies it has been concluded that wise persons try to overcome subjectivity in their judgments, are empathic, caring, and want to learn new things (Ardelt, 2003). People with higher wisdom results are also competent in problem-solving and making decisions, are flexible and open to new ideas, offer their knowledge to others and reach their goals, can adequately perceive their own and others' emotions and react to them, are able to joke and speak ironically, and analyze their life experience and learn from it (Webster, 2007).

So far only minor emphasis has been placed on further examination of people nominated as wise. In one such study wisdom nominees displayed higher results at

wisdom-related performance than all other groups (Baltes, Staudinger, Maercker & Smith, 1995). In another study the nominated wise people were interviewed and it was found that they did not regard themselves as more wise in any extraordinary way (Yang, 2008). To date differences between self-evaluations of wise persons and evaluations made by others have not been studied. The issue of evaluation of self and others has been reviewed in a number of non-wisdom studies. For example, students in the experimental group of one study stopped overrating their own skills after specific training, unlike students in a control group (Little et.al, 2005). Thus, when people become better informed, they become more critical of themselves, and stop overestimating their own abilities. Another study shows that students evaluate their own and their closest friends' characteristics higher than those of other students (Brown & Kobayashi, 2002). Other studies show a similar tendency – individuals evaluate themselves higher when comparing themselves with "average" others (Hamamura, Heine & Takemoto, 2007). On the one hand, results of studies show that people tend to evaluate themselves and those close to themselves higher than others. On the other hand, there is a tendency for more knowledgeable people to rate themselves lower. There are no clear results in regard to this issue. Research questions raised in this study are the following: (1) What are the differences between self-evaluations and peer-evaluations of wise students' characteristics? (2) Are there differences between the self-evaluations of wise students and other students?

Authors of the current study emphasize that the "wise students" group is based on criteria formed by the laypersons' view, not by any questionnaires measuring intellectual abilities or wisdom.

Method

Participants

The final sample in this study consisted of 226 students from 17 different university programs (including Psychology, Sociology, Information Technology, Journalism, English, Management and Mathematics): twenty-three of them were male (10.2%) and 203 were female (89.8%). Participants' ages varied from 18 to 44 years, with a mean age of M = 22.11 (SD = 3.77) years. The final sample was divided into two sub-samples – wise female students (n = 28) and the other students (n = 194). The "wise students" group was formed from students who were most frequently nominated as wise by their peers, and had previously filled out a Personal Characteristics Checklist (PCC) about themselves (for details of this procedure see below). The "other students" group consisted of students who had filled out the PCC in the first stage of the study and had not been nominated as wise, not even a single time. The age of the wise students (n = 28) ranged from 18 to 44 years; the mean age was M = 22.46 (SD = 5.35) years. Initially, four of the wise students were male, but they were removed from the sample because of the extreme gander discrepancy. The other students were aged M = 22.00 (SD = 3.5) years; 19 of them were male and 175 female.

Instrument

To collect students' self-evaluations, the Personal Characteristic Checklist (PCC) was used. The PCC is a list of 54 characteristics such as *friendly, erudite, disciplined,*

inquisitive, witty, shameless and others. PCC was also used in the third stage of the study, but with the difference that participants had to evaluate characteristics not of themselves but of a wise student. Participants were asked to assess items on a 1–5 point Likert scale. Initially the checklist consisted of 126 characteristics. It was then used in a study to investigate conceptions of wise persons (Ivanova & Raščevska, 2010). In the study, participants were asked to evaluate a person whom they knew and considered to be wise. An exploratory factor analysis was conducted, and 54 items were found to define four factors. These four factors and the corresponding four scales of the PCC are as follows: Social skills, Egocentrism, Self-regulation and Erudition-Giftedness. The Egocentrism factor mostly contains characteristics that are least typical of a wise person, but it appeared as a unitary factor in the first study. The scales had high internal consistency – Cronbach's alphas from .83 to .90. Participants were also asked to indicate their age and gender.

To collect nominations for wise persons there was a brief poll with three questions, of which one was actually important for the study: "In your opinion, which of your course-mates is wise? Write down the names of 1 to 3 persons who are most appropriate for this characteristic (except yourself)." The other two questions focused on naming sociable and warm-hearted course-mates. This was done to avoid biasing evaluations in any way.

Students were also asked to give their average grade for the last semester, which they could find in the students' electronic system of the university (average grades are calculated automatically for each student in this system); grades were collected separately for the group of wise students and the other students.

Procedure

There were three stages in the study, and all data were gathered electronically using on-line questionnaires. First, a vast amount of information – names and e-mail addresses – was gathered for 544 students in 22 different university programs. Then, students in each group were coded – each group was assigned a letter (A to Z), and each person was assigned a number. Thus, individual codes were assigned to each potential participant, e.g. *A1, A2, J10, X7*, etc. Special lists were made with each name, e-mail address and individual code. Coding was used to allow researchers to identify responses without the need for students to give their names.

In the first stage, students were asked to participate in this study and to fill out the PCC and indicate their age and gender, as well as their individual code, which was sent with the invitation. No information that the study was about wisdom was given, so that participants' evaluations of themselves would not be biased in any way.

For the purposes of the second stage, an on-line questionnaire was constructed for each group of students. All students were asked to answer three questions nominating sociable, wise and warm-hearted students from their course. Only nominations for the wise students' group were used further. Altogether, 151 students made nominations. Each nomination for the "wise group" was recorded in a special list for each group. The number of votes for each person was counted and summarized, and used to form a group of 45 students who had been frequently nominated as wise. Thirteen students

who were nominated frequently were not included in the wise students' group because they had not filled out the PCC about their own characteristics in the first stage of the study; consequently, there were no data about their self-evaluation, leaving 32 students in the wise students' group; of them 28 female students formed the final wise student sub-sample.

The aim of the third stage was to gather peer-evaluations about wise students' characteristics. Several students from each course were randomly chosen and asked to evaluate characteristics of their course mate, by filling out the PCC. They were not told that the course mate was wise, only a person's name was given. Of 303 students, 124 gave their evaluations. Peer-evaluation for each of the wise students was the mean of three independent evaluations. If there were more than three evaluations, three were randomly chosen for further analysis. After the main stages of the study, students were asked to indicate their grade point average.

Results

First of all, the reliability of scales was calculated for each subgroup (e.g. self-evaluation or peer-evaluation) and for the entire sample. Cronbach's alphas ranged from .76 to .85 (see Table 1), with the lowest value on Erudition-Giftedness scale, and the highest on Self-Regulation scale.

Table 1. **Chronbach's Alpha Reliability of PCC Scales**

Scale	*Cronbach's alpha (N=226)*
Social skills	.78
Egocentrism	.81
Self-regulation	.85
Erudition-giftedness	.76

The first research question was: What are the differences between self-evaluations and peer-evaluations of characteristics of wise students? To find out if there were any differences on the four scales of the PCC, t-test for paired groups was used (see t_1 in Table 2). T-test for paired groups was also calculated for each of the items on the PCC scales (see t_1 in Tables 3 and 4).

Table 2. **Descriptive and Inferential Statistics of Self-Evaluation and Peer-Evaluation of PCC Scales**

	Self-evaluation by wise female students (n=28)		*Peer-evaluation of wise female students' (n=28)*			*Self-evaluation by the other students (n=194)*		
Scale	*M*	*SD*	*M*	*SD*	t_1	*M*	*SD*	t_2
Social skills	3.68	0.44	3.87	0.42	-1.70	3.75	0.43	-0.86
Egocentrism	2.76	0.58	2.64	0.45	0.98	2.93	0.53	-1.58
Self-regulation	3.59	0.52	4.13	0.32	-4.47**	3.50	0.51	0.86
Erudition-giftedness	3.41	0.45	3.91	0.32	-5.23**	3.33	0.52	0.81

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

The second research question was whether there were significant differences between self-evaluations by the wise students and self-evaluations by the other students. T-test for independent samples (t_2) was used to test whether there were such differences at the scale level (see t_2 in Table 2) and for each item (see t_2 in Table 3 and Table 4).

It can be seen in Table 2 that on two scales – Self-Regulation and Erudition-Giftedness – peer-evaluation of wise students was significantly higher than wise students' self-evaluation. There were no significant differences between self-evaluations by wise students and self-evaluations by other students on any of PCC scales.

Table 3. **Descriptive and Inferential Statistics of Self-Evaluation and Peer-Evaluation of person characteristics in PCC Social skills and Egocentrism scales**

	Self-evaluation by wise female students (n=28)	***Peer-evaluation of wise female students (n=28)***		***Self-evaluation by the other students (n=194)***	
Characteristic	***M_1 (SD_1)***	***M_2 (SD_2)***	***t_1***	***M_3 (SD_3)***	***t_2***
Scale: Social skills					
friendly	4.39 (0.79)	4.27 (0.62)	0.60	4.36 (0.71)	0.22
helpful	4.07 (0.60)	4.10 (0.75)	-0.12	4.06 (0.74)	0.10
kind-hearted	3.93 (0.60)	4.12 (0.60)	-1.22	4.10 (0.78)	-1.13
reliable	4.29 (0.66)	3.98 (0.64)	2.11*	4.24 (0.69)	0.35
generous	3.46 (0.74)	3.81 (0.56)	-1.90	3.54 (0.81)	-0.47
selfless	3.50 (0.79)	3.46 (0.51)	-0.22	3.15 (0.84)	2.10*
optimistic	3.46 (0.92)	3.94 (0.61)	-2.50*	3.77 (0.96)	1.57
attentive	4.00 (0.82)	3.84 (0.70)	0.70	3.83 (0.79)	1.06
sincere	3.93 (0.60)	4.04 (0.54)	-0.90	3.96 (0.71)	-0.25
witty	3.25 (0.89)	3.52 (0.68)	-1.37	3.69 (0.83)	-2.62**
courageous	3.00 (0.90)	3.73 (0.75)	-3.31*	3.30 (0.98)	-1.52
organizing	3.68 (0.72)	3.90 (0.70)	-1.09	3.38 (1.07)	1.42
polite	4.07 (0.60)	4.41 (0.56)	-2.25*	4.08 (0.78)	-0.72
excited	3.18 (0.90)	3.10 (0.64)	0.41	3.08 (1.04)	0.46
Scale: Egocentrism					
insistent	3.25 (0.80)	3.11 (0.74)	0.72	3.37 (0.92)	0.63
ambitious	3.36 (0.95)	3.35 (0.73)	0.05	3.46 (0.96)	-0.55
arrogant	2.32 (0.94)	1.95 (0.71)	1.58	2.49 (1.06)	-0.82
deceitful	2.36 (0.87)	2.19 (0.69)	0.74	2.79 (1.07)	-2.04*
self-confident	3.04 (0.92)	4.01 (0.43)	-5.13**	3.35 (1.01)	-1.54
supercilious	2.18 (0.82)	2.04 (0.64)	0.63	2.49 (1.05)	-1.52
cynical	2.21 (0.99)	2.01 (0.73)	0.78	2.68 (1.13)	-2.05*
eccentric	2.57 (1.00)	2.93 (0.73)	-1.53	2.98 (1.00)	-2.01
egoistic	2.86 (0.97)	2.30 (0.66)	2.24*	3.02 (1.03)	-0.77
calculating	2.36 (1.16)	2.45 (0.69)	-0.32	2.71 (0.97)	-1.76
brazenfaced	2.00 (0.86)	2.02 (0.70)	-0.10	2.55 (1.02)	-2.71**
unaccommodating	2.75 (0.80)	3.04 (0.67)	-1.28	3.09 (0.93)	-1.86
small-minded	2.96 (1.04)	2.63 (0.75)	1.33	2.87 (1.16)	0.40
rebellious	2.89 (1.03)	2.63 (0.86)	0.91	3.09 (1.03)	-0.94
strict	3.43 (0.92)	2.92 (0.71)	2.21*	3.04 (1.00)	1.96*

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

As can be seen in Table 3 and Table 4, almost a half of characteristics revealed significant differences (see t_1) between self-evaluations and peer-evaluations for wise students. Mostly, peer-evaluations were higher. Most crucial differences were for the following characteristics: *knowledgeable, self-confident, erudite, hard-working, genius, professional, courageous, even-tempered, accurate, restrained, enterprising, insistent, optimistic, purposeful, self-dependant, talented* and *gifted*. Others evaluated these as more typical of wise students than the wise students perceived themselves.

Table 4. **Descriptive and inferential statistics of self-evaluation and peer-evaluation of characteristics in PCC *Self-regulation* and *Erudition-giftedness* scales**

	Self-evaluation of wise female students' group (n=28)	***Peer-evaluation of wise female students' group (n=28)***		***Self-evaluation of the other students' group (n=194)***	
Characteristic	$M_1 (SD_1)$	$M_2 (SD_2)$	t_1	$M_3 (SD_3)$	t_2
Scale: Self-regulation					
disciplined	4.04 (0.64)	4.19 (0.58)	-1.01	3.54 (0.99)	2.56**
conscientious	4.11 (0.99)	4.32 (0.56)	-1.09	3.77 (0.91)	1.83
accurate	3.50 (0.96)	4.01 (0.59)	-3.00**	3.32 (1.01)	0.89
even-tempered	3.14 (1.01)	3.80 (0.64)	-2.96**	3.23 (0.90)	-0.48
hardworking	3.61 (0.83)	4.37 (0.56)	-4.18**	3.40 (0.88)	1.16
active	3.46 (0.88)	4.20 (0.47)	-3.91**	3.37 (0.78)	0.61
purposeful	3.93 (0.86)	4.43 (0.36)	-2.96**	3.66 (0.86)	1.52
self-reliant	3.46 (1.00)	3.82 (0.56)	-1.88	3.56 (1.00)	-0.48
responsible	4.36 (0.49)	4.39 (0.45)	-0.29	3.93 (0.82)	2.71**
restrained	3.25 (0.80)	3.88 (0.58)	-3.59**	3.22 (0.89)	0.16
self-dependant	3.68 (0.86)	4.30 (0.53)	-3.71**	3.67 (0.96)	0.03
enterprising	3.57 (0.79)	4.23 (0.37)	-3.68**	3.40 (0.81)	1.07
sharp-eyed	3.60 (0.83)	4.01 (0.38)	-2.17*	3.62 (0.89)	-0.09
insistent	3.64 (0.91)	4.15 (0.51)	-2.31*	3.50 (0.94)	0.76
forward-looking	3.25 (0.89)	3.81 (0.60)	-2.92**	3.24 (0.85)	-0.16
Scale: Erudition-giftedness					
erudite	3.61 (0.74)	4.44 (0.50)	-5.26**	3.53 (0.80)	0.51
gifted	3.36 (0.78)	4.00 (0.48)	-3.61**	3.10 (0.99)	1.30
progressive	3.50 (0.58)	3.98 (0.50)	-3.16**	3.51 (0.76)	-0.07
critical	3.61 (0.96)	3.29 (0.72)	1.38	3.68 (0.93)	-0.39
inquiring	4.14 (0.65)	4.42 (0.36)	-1.86	3.91 (0.79)	1.51
talented	3.25 (0.84)	3.99 (0.52)	-4.34**	3.13 (1.02)	0.97
knowledgeable	3.64 (0.73)	4.46 (0.39)	-5.33**	3.54 (0.71)	0.71
professional	3.04 (0.96)	3.85 (0.52)	-3.86**	2.89 (0.92)	0.77
genius	2.32 (0.90)	3.30 (0.52)	-4.94**	2.54 (1.07)	-1.03
idealist	3.75 (0.93)	3.35 (0.80)	1.81	3.41 (1.11)	1.54

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

When comparing self-evaluations of wise and other students, it can be concluded (see t_2 in Table 3 and Table 4) that wise students evaluated themselves as more *disciplined, responsible* and *strict* when compared with the other students. However, the

other students evaluated themselves as more *witty, brazenfaced, deceitful, eccentric* and *cynical*. There were differences on only 9 of 54 characteristics; thus for the most part mean self-evaluations were rather similar for both wise and other students.

Some time after the main three stages of the study a subgroup of students reported their grades. The data were summarized, and the results show that the wise students group's mean level of academic performance was M = 8.86 (SD = 0.61) (maximum grade is 10); altogether 23 wise students reported their grades. For the other students' group the mean grade was M = 7.55 (SD = 0.90), but it must be noted that only 49 of 194 students from this group reported their grades. The t-test was used and results showed that there were significant differences ($t = 6.33$, $p < .01$), meaning that wise students have significantly higher grades.

Discussion

Results of this study show that there are significant differences between wise students' self-evaluation and peer-evaluation on more than half of the PCC characteristics and on the scales Self-Regulation and Erudition-Giftedness – peer-evaluations are mostly higher. It was also found that self-evaluations were mostly similar for wise students and other students.

It is important to note that at the time of the study students were not informed about the focus of the study, and thus evaluations were not encouraged in any direction. In addition, nomination and evaluation of wise students were organized at separate stages of the study; consequently the data should reflect how the wise students were perceived as persons. It is most common in such studies that participants are asked to both imagine a wise person and to evaluate or describe this person at the same time.

If we look particularly at evaluation of individual characteristics, it can be concluded that peers emphasized wise students' characteristics that are related to overall erudition, desire to attain development, self-confidence, self-regulation and giftedness (e.g., *Knowledgeable, Purposeful, Even-tempered, Disciplined*, *Talented, Genius*). Several other regulative abilities such as determination and working hard have also been evaluated rather high, indicating that wise students are seen as diligent and taking pains to achieve certain goals. Ability to achieve one's goals corresponds to wisdom theory (Sternberg, 2003). Characteristics that describe different social skills have also been evaluated moderately highly, but the emphasis of peer-evaluation of wise students' characteristics was placed on erudition and dutifulness, not friendliness or other related characteristics.

By contrast, self-evaluations of wise students showed that they initially stressed characteristics that describe their social skills, and only then – inquisitiveness, knowledge and regulative abilities. This differs from what other students see as most relevant to wise students – knowledge and determination. It might be that peer-evaluations are based on the grades of wise students and other activities that can be seen in daily life. Other students may judge these activities and draw certain conclusions about students' characteristics. Possibly the self-expectations of wise students are higher, which would make their current self-evaluation lower because they do not reach the level to which they aspire. This would explain the results of self-evaluations, which are comparatively lower than how others perceive them.

Peer-evaluations of wise students in this study match the results of some of the previous studies in which a wise person's knowledge and striving to learn more, as well as strictness, has been emphasized (Ivanova & Raščevska, 2010). Accentuation of intellectual abilities can be related to features that are crucial to wisdom in Western cultures (U.S. and Europe) where knowledge, experience and especially ability to grasp new knowledge quickly is stressed (Yang & Sternberg, 1997).

When comparing self-evaluations of wise and other students, it turned out that self-evaluations were rather similar for both groups, with only some characteristics differing significantly. Wise students have stressed their discipline and responsibility. However, the other students have emphasized their confidence that borders on shamelessness. These results indicate that wise students think they have high regulatory abilities, and this was also emphasized by their peers in peer-evaluations. However, wise students have not stressed their erudition, academic achievements and other characteristics. The students' grades show that the wise students have significantly higher grades that indicate actual higher level of academic achievement; still this was not reflected on their self-evaluations.

It can be concluded that wise students as a group can not be identified and differentiated using only self-evaluation because they do not evaluate themselves higher. This could be interpreted that wise students are more self-critical or they have higher expectations or diverse conceptions of wisdom. There might be a tendency for wise people to evaluate themselves in a way so that they fit in the mainstream, and for other people to give socially desirable answers so that they "look better". This raises doubts about using self-evaluation methods in wisdom studies, and researchers have to be cautious about whether persons who show higher results in such questionnaires are indeed wiser than those whose results are lower.

When analyzing characteristics that are the least typical of wise students, it turns out that in peer-evaluations the characteristics with the lowest scores are: *egoistic, calculating, deceitful, cynical, arrogant, brazenfaced* and *supercilious*. These results indicate that it is not typical for wise students to act against the common rules of society. Wise students try to achieve their goals and success by using their knowledge and hard work, not by taking advantages and using tricks. Results of studies in Eastern cultures emphasize such qualities of wisdom as prudence (Takahashi & Bordia, 2000), positive effects on self and others (Yang, 2008), indulgence and humbleness (Yang & Sternberg, 1997), as well as self-control (Lim, Plucker & Im, 2002) and it is similar to what can be concluded from the results in this study.

There are several limitations to this study. There is a small sample of wise students (n=28). The sample in the study was not homogeneous because different undergraduate and also some graduate groups of university programs were included. Because of the extreme imbalance of gender, several wise male students were removed from the sub-sample, however, it would be beneficial to investigate a sample with an even number of male and female students who are nominated as wise. It would be also interesting to add other research tools to such a study; for example, wise students could be asked to complete a test for cognitive abilities or personality traits. It would also be useful to use several wisdom questionnaires in one study and compare their results. It would be

necessary to intentionally form a control group of the other students and also collect peer-evaluations of them. Thus peer-evaluations of wise and the other students could be comparable, and it would be clear if there is or is not an overall tendency for peer-evaluations to be higher than self-evaluations.

To conclude, this study gives insight into the comparison of how wise students perceive themselves and how they are perceived by their peers. It is typical for wise female students to emphasize their own social skills. On the contrary, their peers emphasize wise female students' erudition, cognitive and self-regulation abilities and generally evaluate wise students higher.

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The Self-Concept of Adolescents with Different Social Status in Peer Cliques

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The purpose of this research was to investigate the self-concept of adolescents with different social status in peer cliques. The sample consisted of 297 participants from Russian-language based schools in Latvia, 14-17 years of age. Participants completed the Russian version of the Self-Description Questionnaire-II . The Social Cognitive Map procedure was used to identify peer cliques within each classroom and to determine a student's social standing within her or his peer group. Results showed differences in physical and social aspects of self-concept of adolescents with different social status in peer groups. Adolescents who were nuclear members of their peer group reported: (1) more positive opposite-sex relation and same-sex relation self-concepts than adolescents with secondary centrality; and (2) more positive physical ability, physical appearance, and same-sex relation self-concepts than peripheral/ isolated adolescents. Adolescents with secondary centrality reported: (1) more positive physical ability and same-sex relation self-concepts than peripheral/ isolated adolescents; and (2) less positive opposite-sex relation and same-sex relation self-concepts than nuclear adolescents. Peripheral/ isolated adolescents reported: (1) had less positive physical ability and same-sex relation self-concepts than all other participants of the research; and (2) less positive physical appearance self-concept than adolescents with nuclear status.

Key words: self-concept, social status, peer clique, network centrality

Introduction

A healthy, positive self-concept is generally considered to be a desirable goal in itself, as well as an important means to facilitate the attainment of other favorable psychological, behavioral, and educational outcomes (Marsh, 2007). The self-concept is important for psychological well-being and social functioning. Therefore, it is necessary to find out how the self-concept develops, and what conditions are important for the formation and maintenance of positive self-concept.

An important developmental period for self-concept is adolescence (Harter, 1999, 2006; Rosenberg, 1965). Adolescents undergo the process of growth between childhood and adulthood and they experience rapid physical and psychological change. Adolescents have to make important personal and occupational choices. As a result they are concerned with their self and try to find out who they are and what they are like (Erikson, 1950; 1968; Harter, 1999, 2006; Rosenberg, 1965).

Experiences with peers play an important role in the development of an adolescent's self-concept. Individuals acquire self-concepts through experience with and interpretations of their environment (Bracken & Lamprecht, 2003; Harter, 1999, 2006; Marsh, 2007; Shavelson, Hubner, & Stanton, 1976). Their self-concepts are

influenced especially by the evaluations of significant others (Marsh, 2007). During adolescence such significant others are peers. Experiences with peers constitute an important context in which adolescents develop, test, and observe their behaviors and attributes, and become aware of them (Asubel, 2002; Brown, 1990, 2004). Thus it is peers who become the main source of appraisals that adolescents use to build their self-concepts, and adolescents receive information about their behaviors or attributes directly from their personal experiences with peers and can use this information as a basis for developing their self-concepts.

There is evidence that adolescents with different social status among peers have different experiences with peers. Depending on their status in a peer group adolescents have different interactions and relations with peers, they develop and demonstrate different behaviors and attributes, and they receive different evaluative feedback from others. Taking into account that individuals use their own observations and evaluations they receive from others to build their self-concepts, it is important to investigate the self-concept of adolescents with different social status among peers. The results of such study can be important for better understanding the role of social experiences with peers for adolescents' self-concept at this stage of human development.

It is necessary to note that the association between adolescent self-concept and social status among peers is well documented. Empirical research on this topic has been conducted in different countries, including the USA (Chambliss, Muller, Hulnick, & Wood, 1978; Chiu, 1987; Rosenberg, 1965), the Netherlands (De Bruyn & Van Den Boom, 2005), in Taiwan (Chiu, 1987), Russia and Lithuania (Valickas & Gippenreiter, 1989), Belarus (Kolominsky, 1976) and Latvia (Ļevina, Ivanova, & Jenenkova, 2012; Mārtinsone, 1998a, 1998b). The empirical studies mentioned above allow to conclude that adolescents with high social status among peers have more positive self-concept. However, all these investigations of the self-concepts of adolescents with different social status have centered on social status in formal groups, such as among school classmates (groups that are not self-selected).

Relatively little is known about self-concepts of adolescents with different status in informal peer cliques, although the importance of peer cliques to adolescents has been well established. How adolescents fit into peer cliques is an important element of the context of adolescents' lives and how they develop cognitively, socially, and emotionally.

The literature analysis allows one to conclude that there are few studies on the associations between self-concept and social status in the peer clique. Perhaps this gap in the empirical research was associated with the absence of valid and reliable assessment tools and appropriate and available software, such as the Social-Cognitive Map (Cairns, Leung, Buchanan, & Cairns, 1995; Cairns, Perrin, & Cairns, 1985; Gest, Farmer, Xie, & Cairns, 2003) and the software SCM (Leung, 1998), which allows one to identify peer cliques and to determine social status of group members. In some empirical studies researchers have used qualitative methods such as observation to identify children's and adolescents' peer cliques in natural settings and to determine their social status. However, such studies are considered as costly and often constrained by limited access to the interactional settings (Kindermann & Gest, 2009).

Nevertheless, existing qualitative studies are important for an understanding of the associations between self-concept and social status in the peer clique. Specifically,

it has been found that in preadolescence social status in the peer clique was related to such aspects of self-concept as general self-esteem (Adler & Adler, 1996). However, it is unknown if this relationship exists in adolescence.

Moreover, it is necessary to take into account that the structure of self-concept is multidimensional. Self-concept is a person's perception of the self in different domains and includes specific academic (e.g., mathematical, verbal) and nonacademic (e.g., physical, social, emotional) components in addition to global self-esteem (Marsh, 2007; Shavelson et al., 1976). Thus, it is unclear how adolescents' social status in the peer clique is related to specific aspects of self-concept. Therefore, in addition to global self-esteem the purpose of this study is to explore multiple specific aspects of self-concept of adolescents with different social status in informal peer cliques.

Peer Clique, Social Status and its Association with Adolescents' Self-Concept

Cliques are the informal peer groups which are set up and controlled by children and adolescents themselves. These groups are interaction-based entities, comprising a limited number of members identified as a group because they "hang around" together to develop close relationships (Brown, 1990). Thus these groups depend on individual preferences. Peer cliques vary in size, intimacy, and openness, however, as Brown notes, "they remain small enough to allow for regular interaction of all members, to ensure that all members understand and appreciate one another better than do people outside the clique, and to permit members to regard the clique as their primary base of interaction with groups of age mates" (Brown, 1990, p. 177).

Some theorists argue that the smallest possible clique size is three members (Brown, 1990; Kindermann & Gest, 2009), while others consider that cliques can include two persons (Steinberg, 2011). Adolescent social network researchers (Cairns, Leung, Buchanan, & Cairns, 1995; Lansford, Costanzo, Grimes, & Puttallaz, 2009) have included two persons as a clique.

Although peer cliques are groups of associates the adolescent chooses for himself or herself, members' positions are not equal. Researchers have differentiated between levels of centrality in clique membership. Centrality refers to the individual's position (nuclear, secondary, peripheral or isolated) in a peer clique (Lansford, Costanzo, Grimes, & Puttallaz, 2009). Some clique members occupy core positions, others are at the periphery of the group. Thus, centrality characterizes adolescents' social status in their cliques.

The concept of social network centrality refers to the general prominence and social linkages of youth within a hierarchically structured peer system (Cairns & Cairns, 1994). In other words, individuals with high centrality have higher levels of social visibility and a greater number of social connections.

In recent years researchers have increasingly focused on social network centrality. Though the importance of this construct for the adolescent's experiences with peers is evident in much research, little work has examined the self-concepts of adolescents with different centrality in cliques. Little is known about whether multiple aspects of the adolescent's self-concept are influenced by his or her place in the peer cliques. It

is possible to suggest that adolescents who are central to a peer clique can have more positive experiences with peers, more positive evaluative feedback and in different domains than more peripheral clique members. As a result more socially central adolescents can develop more positive self-concepts in these domains.

First, as already mentioned above, there is evidence that in preadolescence social status in the peer clique is related to such aspects of self-concept as general self-esteem. In particular, Adler & Adler (1996) in their qualitative research, have found that the so-called 'wannabes' (group members at the periphery of the peer clique) and social isolates had lower self-esteem than accepted members of peer groups. Similarly, it is possible to expect that more central adolescents should have higher general self-esteem compared with those who are at the periphery of the clique. Nuclear adolescents have more linkages and interactions with their peers and as a result can receive emotional support and acceptance from the other group members to a greater degree than secondary, peripheral, and especially isolated adolescents. Such an experience of support and of being accepted strengthens an adolescent's self-confidence and creates positive general self-esteem.

Second, there is some empirical evidence showing that adolescents who are more central to their clique, more often receive peer nominations of indirect aggression, such as excluding others or talking about them behind their backs, as well as peer nominations of leadership (Lansford, Costanzo, Grimes, & Puttallaz, 2009). More central adolescents are perceived as more sophisticated in social and interpersonal skills. Taking into account that individuals use their own observations and evaluations they receive from others to build their self-concepts, it is possible to expect that more central adolescents should have more positive social self-concepts, i.e. more positive self-perceptions in the area of peer relations.

Third, adolescents experience rapid physical changes and are preoccupied with their own appearance. Adolescents consider that appearance-related variables such as grooming, wearing the "right" clothes, attractiveness, and athletic abilities are important criteria of popularity (Eder, Evans, & Parker, 1995). Popular adolescents are perceived and described by their peers as more favorable in these same terms (de Bruyn & van de Boom, 2005; La Fontana & Cillessen, 2002; Prinstein, 2007). At the same time adolescents tend to communicate and interact more with popular peers. Therefore, it is possible to think that nuclear adolescents, who have more linkages with peers, should also be more popular and hence perceived as more physically attractive and with better athletic abilities. Moreover, they actually can be more attractive, and can have better physical abilities. In turn, their attractiveness and athletic abilities make them more prominent in the peer clique as compared to other group members. By using this experience of evaluations from one's peers, one's own observations, and the results from comparison with others, nuclear adolescents can develop more positive physical self-concept, that is, self-perception in the area of appearance and physical abilities.

There is a lack of research about the associations between adolescents' centrality in the peer clique and their emotional characteristics or academic achievement. It is also unknown which emotional and academic characteristics are important for social status in the peer clique, or how adolescents perceive and describe central clique members in regard to these aspects.

The Present Study

Examination of the existing literature suggests that adolescents with different social status among peers have different experiences with peers, develop and demonstrate different behaviors and attributes, receive different evaluative feedback. They use their own observations and evaluations they receive from others to build their self-concepts.

Previous investigations have focused on relations between adolescents' self-concept and social status in formal groups – school classes. Little is known about the differences in self-concept of adolescents with different social status (centrality) in informal peer cliques. Thus, the main objective of this study was to investigate whether adolescents with different social status (centrality) in peer cliques differ in multiple aspects of self-concept.

In the present study it was expected that adolescents with higher social status in the peer clique (more central) would have more positive general self-esteem. It was also expected that adolescents with higher social status in the peer clique (more central) would have more positive social and physical self-concepts. The question was raised as to whether adolescents with different social status (centrality) in peer cliques would differ in emotional and academic self-concepts.

In comparison to childhood peer cliques which are more often anchored in the neighborhood, adolescent peer cliques are more likely to be anchored at the school (Brown, 1990) and tend to form within the boundaries of a grade or classroom where there exist the greatest opportunities to interact (Hargreaves, 1972). Therefore, this research will focus on relations between multiple aspects of adolescents' self-concept and social status in peer cliques which form among school classmates.

This study contributes to the existing literature on self-concept of adolescents with different social status among peers by (a) focusing on social status in informal friendship groups – peer cliques; (b) focusing on multiple aspects of self-concept (physical, social, emotional, academic, general); (c) including social centrality measures to assess clique membership and prominence.

Method

Participants

Participants in this study were 297 adolescents aged between 14 and 17 years (M = 15.11, SD = .46); 49.5% of the participants were boys (n = 147) and 50.5% were girls (n = 150). The students were from 15 classrooms of six different Latvian secondary schools. All participants were studying in the 9th grade in Russian-language based schools in the capital city of Riga.

The choice of participants of this research was due to the fact that Latvia is a multi-ethnic society with representatives of more than 150 nationalities (Latvijas Republikas Ārlietu ministrija, 2012). The ethnic composition of Latvian society constitute 57.6% Latvian, 29.6% Russian, 4.1% Byelorussian, 2.7% Ukrainian, 2.5% Polish, 1.4% Lithuanian, 2.1% other nationalities (Latvijas Republikas Izglītības un zinātnes ministrija, 2012). Russians constitute the largest ethnic group among the minorities living in Latvia.

The multi-ethnic structure of Latvian society is reflected in education system. In Latvia there exist a large number of secondary schools for ethnic minorities, among which approximately 95% of schools are schools with Russian or Russian and Latvian language. Thus, the fact that the Russians is the largest ethnic group among the minorities living in Latvia and Russian-speaking adolescents are a large part of Latvian society was the reason to organize the sample from adolescents from Russian-language based schools.

Measures

Self-Concept. To assess adolescents' self-concept the Russian version of the Self-Description Questionnaire-II (SDQ-II; Ļevina & Ivanova, 2011) was used. The original English version of the SDQ-II was designed by Herbert Marsh (1990) for use with the young and middle adolescent group. It consists of 102 items and eleven subscales and measures students' perceptions of their ability in math, verbal, and school in general as well as students' perceptions of their physical abilities, physical appearance, same-sex relations, opposite-sex relations, parent relations, honesty/trustworthiness, and emotional stability. The general-self domain measures students' perception of their overall self-esteem.

Responses are made on a 6-point Likert scale. The response categories are (1) "false", (2) "mostly false", (3) "more false than true", (4) "more true than false", (5) "mostly true", and (6) "true". Each of the 11 SDQ-II scale scores is based on the respondent's self-ratings on 8-10 items. Half of items are negatively worded. If the item is negatively worded, it is necessary to reverse the value of the student's response by subtracting it from 7. Higher scores reflect more positive self-concept.

Two independent translators translated the SDQ-II from English into Russian (multiple forward translations). The two Russian versions of the SDQ-II items were compared and the best items chosen (in discussion between one translator and an independent expert). "Better" translations were determined to be better for the following reasons: (a) appropriateness of the terminology; (b) linguistic correctness; (c) equivalence between the English and the final Russian versions. The scales of the Russian version of the SDQ-II (Ļevina & Ivanova, 2011) showed high internal consistency levels ranging from .70 to .90. Test-retest reliability over a 4-week interval for all scales was above .52

Peer Groups and Social Status (centrality). To identify peer groups that exist within each classroom and to determine adolescents' level of centrality within the peer group the Social Cognitive Map (SCM) procedure developed by Cairns and colleagues (Cairns et al., 1985) was employed. The students are first asked: "Are there some people here in your class who hang around together a lot?" They are asked to list together the names of the classmates who hang around together, and to list all of the groups in their class. They are also reminded to include themselves in the group to which they belong. In the present research students wrote their responses. SCM was administered in a group setting separately in each classroom.

The software SCM version 4.0 (Leung, 1998) was used to identify peer groups within a social network and to determine participants' social status based on the SCM procedure. After the participant's responses are entered, the program SCM 4.0 produces

a recall matrix, a co-occurrence matrix, and a correlational matrix. The recall matrix lists the clusters of students named by each participant. The co-occurrence matrix shows the number of nominations that each student received for being members of a peer group along with each other student in the class. The correlational matrix represents the correlations between all possible pairs of students in a classroom, that is, the degree of consistency with which pairs of participants appear in their classmates' recall of peer groups.

Identification of peer groups is based on the correlations in the correlation matrix. A cutoff point of .40 for the correlation is employed to determine whether two participants belong to the same peer group.

Social status, that is, the level of centrality within identified peer groups is determined by the number of times the participant is nominated as a member of any peer group. The centrality of each student in his or her peer group is derived by comparing the number of nominations he or she receives with the number of nominations received by the two members of his or her peer group with the greatest number of nominations to the group. A student has high centrality in a peer group (nuclear member) if the frequency of nominations he or she receives is >.70 times the average of the two most frequently nominated members of the same group. A participant has low centrality (peripheral member) if this frequency of nominations is < .30. At last a student has medium centrality (secondary member) if this number of nominations he or she receives is between .30 and .70. Finally, a participant is isolated if he or she has not been nominated as a member of any group.

Procedure

Data were collected during the period 16th December 2010 to 27th January 2011. The questionnaire administration took place during regular school hours. The teacher was not present during the data collection, and data were collected in class groups without any time limit.

Pupils and their parents were informed about the research and parental consent was initially established. The adolescents were assured that participation was voluntary. The adolescents also were told that their answers would be confidential.

Results

Peer Cliques Derived from the SCM Procedure and Descriptive Data

The SCM procedure resulted in 78 peer groups that ranged in size from 2 to 14 members (M = 6.23, SD = 2.70). One student was not identified as being a member of any group. There were 123 boys in 30 all-male cliques that ranged in size from 2 to 14 members (M = 6.77, SD = 2.94), and 131 girls in 38 all-female cliques that ranged in size from 2 to 9 members (M = 5.47, SD = 2.32). Forty-two students (26 boys un 16 girls) were in 10 mixed-gender cliques that ranged in size from 3 to 10 members (M = 7.05, SD = 2.50).

In this sample, 240 students (119 boys and 121 girls) had high levels of centrality and were nuclear members of their peer groups, 48 students (24 boys and 24 girls) had

medium levels of centrality and were secondary members, and 8 students (4 boys and 4 girls) had low levels of centrality and were peripheral members. As mentioned above, one student was not identified as being a member of any clique. For further analysis this student was included into the group of low-prominant participants, that is, of students with peripheral centrality. Thus, this group of peripheral / isolated adolescents consisted of 9 individuals (4 boys and 5 girls).

Self-Concept of Adolescents with Different Social Status (Centrality) in Peer Cliques

First, a multivariate analysis of variance (MANOVA) was conducted to assess whether adolescents with different social status in peer cliques, that is, with different levels of centrality, had differences in self-concept ratings. The participants were categorized into three groups: students with nuclear centrality, students with secondary centrality, and peripheral/ isolated students. The results of MANOVA were statistically significant [Wilks' $\Lambda = .825$, $F(284, 568) = 2.61$, $p = .000$, $\eta^2 = .09$]. The results indicated that there were differences in multidimensional self-concept among adolescents with different levels of centrality in peer cliques. Means and standard deviations for scales of the SDQ-II as a function of centrality in peer cliques, and effects of centrality on the SDQ-II scores are displayed in Table 1.

Table 1. **Means and Standard Deviations for Scales of the SDQ-II as a Function of Centrality in Peer Cliques, and Effects of Centrality on the SDQ-II Scores**

	Centrality							
	Nuclear		Secondary		Peripheral / isolated			
Scales of the SDQ-II	***M***	***SD***	***M***	***SD***	***M***	***SD***	***F*(2,294)**	**η^2**
Physical Abilities	36.88[a]	9.07	34.44[a]	10.36	25.33[b]	7.70	7.70***	.05
Physical Appearance	35.31[a]	8.25	32.81	8.88	29.00[b]	11.72	3.86*	.03
Opposite-Sex Relations	35.50[a]	7.57	32.15[b]	8.44	30.78	7.29	5.05**	.03
Same-Sex Relations	47.70[a]	8.32	43.71[b]	8.31	35.00[c]	11.34	13.42***	.08
Parent Relations	38.82	7.69	39.19	6.56	39.44	7.20	0.07	.00
Honesty-Trustworthiness	38.92	7.07	40.06	7.14	40.00	7.12	0.59	.00
Emotional Stability	37.73	9.31	38.25	10.45	36.11	13.96	0.19	.00
Mathematics	37.52	11.79	34.92	11.51	37.76	12.40	0.99	.01
Verbal	40.44	9.37	39.88	7.03	44.56	10.56	1.02	.01
General School	46.19	8.28	44.54	9.39	47.67	9.79	0.94	.01
General Self	47.60	7.39	47.33	8.26	46.00	7.09	0.21	.00

Note. *$p < .05$, **$p < .01$, ***$p < .001$.
[a,b,c,d] Means in the same row differ significantly in the Tukey HSD comparison.

After the multivariate analysis of variance univariate ANOVAs were conducted. In those cases, when univariate ANOVAs revealed significant differences between adolescents with different levels of centrality for SDQ-II scales, *Post hoc* tests using *Tukey HSD* for pairwise comparisons were also performed.

Adolescents' social status (centrality) in peer cliques and general self-esteem. The univariate ANOVA did not reveal significant differences between adolescents with different levels of centrality for General Self scores [F (2, 294) = .21, p > .05]. It is possible to conclude that there were no differences in general self-esteem of the adolescents with different social status in their peer cliques.

Adolescents' social status (centrality) in peer cliques and social self-concept. Univariate ANOVAs revealed significant differences between adolescents with different levels of centrality for Opposite-Sex Relations scores [F (2, 294) = 5.05, p < .01, η^2 = .17] and Same-Sex Relations scores [F (2, 294) = 13.42, p = .00, η^2 = .28]. At the same time there were no significant differences between adolescents with different levels of centrality for Parent Relations [F (2, 294) = .07, p > .05]. Thus, it is possible to conclude that in the area of relationships with peers there were differences in social self-concepts of adolescents with different social status in peer cliques. However, in the area of relationships with parents there were not differences in social self-concepts of adolescents with different social status in peer cliques.

Post hoc tests using *Tukey HSD* were then performed for pairwise comparisons of Opposite-Sex Relations and Same-Sex Relations scores. The results showed that nuclear adolescents had significantly higher scores for Opposite-Sex Relations than adolescents with secondary centrality (p < .05). They also had significantly higher scores for Same-Sex Relations than adolescents with secondary centrality (p < .01) and than peripheral/ isolated adolescents (p = .000). In turn, adolescents with secondary centrality had significantly higher scores for Same-Sex Relations than peripheral/ isolated adolescents (p < .01).

Adolescents' social status (centrality) in peer cliques and physical self-concept. Univariate ANOVAs revealed significant differences between adolescents with different levels of centrality for Physical Abilities scores [F (2, 294) = 7.70, p = .000, η^2 = .22] and for Physical Appearance scores [F (2, 294) = 3.86, p < .05, η^2 = .17]. Thus, in the area of self-perceptions of physical characteristics (appearance and athletic abilities) there were differences in self-concepts of adolescents with different social status in peer cliques.

Post hoc tests using *Tukey HSD* were then performed for pairwise comparisons of Physical Abilities and Physical Appearance scores. The results showed that peripheral/ isolated adolescents had significantly lower scores for Physical Abilities than adolescents with nuclear centrality (p = .001) and than adolescents with secondary centrality (p < .05). Peripheral/ isolated adolescents also had significantly lower scores for Physical Appearance than adolescents with nuclear centrality (p < .05).

Adolescents' social status (centrality) in peer cliques and emotional self-concept. Univariates ANOVA did not reveal significant differences between adolescents with different levels of centrality for Emotional Stability scores [F (2, 294) = .19, p > .05], and for Honesty-Trustworthiness scores [F (2, 294) = .59, p > .05]. It is possible to conclude that there were not differences in emotional self-concepts of adolescents with different social status in peer cliques.

Adolescents' social status (centrality) in peer cliques and academic self-concept. Univariates ANOVA did not reveal significant differences among adolescents with different levels of centrality for Mathematics scores [F (2, 294) = .99, p > .05], for Verbal

scores [F (2, 294) = 1.02, $p > .05$], and for General School scores [F (2, 294) = .94, $p > .05$]. Thus, it is possible to conclude that there were not differences in academic self-concepts of adolescents with different social status in peer cliques.

In summary, the results of the present research showed that there were differences in physical abilities, physical appearance, opposite-sex peer relations, and same-sex peer relations self-concepts between adolescents with different levels of centrality in peer cliques. At the same time there were not found differences in parent relations, mathematics, verbal, and general school self-concepts, as well as in general self-esteem between adolescents with different levels of centrality in peer cliques.

Discussion

The present study was designed to investigate the self-concept of adolescents with different social status in peer cliques. A general issue that concerned this study was whether adolescents with different centrality in peer cliques differed in multiple aspects of self-concept. In particular, the aim of this study was to examine whether there were differences in general self-esteem, as well as in social, physical, emotional, and academic aspects of self-concept for adolescents with different levels of centrality in peer cliques.

It was expected that adolescents with higher social status (centrality) in the peer clique would have more positive general self-esteem, more positive social and physical self-concepts. Also, the question was raised as to whether adolescents with different social status (centrality) in peer cliques would differ in emotional and academic self-concepts.

First, results showed that adolescents with different social status (centrality) in peer cliques had no differences in general self-esteem. This finding is contrary to the hypothesis about relations of adolescents' social status in peer cliques and their general self-esteem, and is inconsistent with the results of Adlers' research (1996), according to which in preadolescence group members at the periphery of the peer clique and social isolates had lower self-esteem than accepted members of peer groups.

This finding has at least two possible explanations. First, being accepted among peers is very important for adolescents' general self-esteem. Low social status in the peer clique, as well as rejection and social isolation can be painfully perceived by adolescents and can threaten their self-esteem. In attempting to protect self-worth, an adolescent can use defense mechanisms such as depreciation of membership in a certain peer group, disavowal of his or her social status, distortion of experience of interactions with peers. As a result the adolescent has a possibility to maintain positive general self-esteem.

Second, comparing our finding of absence of association between adolescents' general self-esteem and their social status in peer cliques with the results of Adlers' research (1996), according to which in preadolescence group members at the periphery of the peer clique and social isolates had lower self-esteem than accepted members of peer groups, we can also postulate that there might be the possible decrease in the importance of peer cliques for general self-esteem during adolescence. However, longitudinal studies are needed to explore this issue. Nevertheless, the fact that in this study there were no associations found between adolescents' general self-esteem and

their social status in his or her peer clique allows one to think that adolescents can evaluate their global self-worth with other means such as congruence between behavior and personality, on the one hand, and one's ideal-self, on the other hand.

Further, on the basis of previous findings it was expected that adolescents with higher social status in the peer clique (more central) would have more positive social self-concepts. It appeared that adolescents who are nuclear members of their peer clique had more positive opposite-sex relation and same-sex relation self-concepts than adolescents with secondary centrality, as well as more positive same-sex relations self-concepts than peripheral/ isolated adolescents. In turn, adolescents with secondary centrality had more positive same-sex relations self-concepts than peripheral/ isolated adolescents. Thus, the research results supported the expectation that there should be differences in social self-concept between adolescents with different social status in peer groups.

The results of the present research show that those adolescents who were more central to their clique had more positive social self-concepts. These findings are consistent with the previous study demonstrating that adolescents with higher levels of centrality in peer groups had been perceived and described by their peers as more visible because of their social skills and behaviors (Lansford, Costanzo, Grimes, & Puttallaz, 2009). Thus, adolescents with higher centrality in peer groups may observe their own behaviors and attributes as well as reflect the expections and evaluations from peers. Using these direct and reflected appraisals they may develop more positive social self-concepts.

It was also expected that adolescents with higher social status in the peer clique (more central) would have more positive physical self-concepts. It was found that adolescents who are nuclear members of their peer clique had more positive physical abilities and physical appearance self-concepts than peripheral/ isolated adolescents. Adolescents with secondary centrality had more positive physical abilities self-concepts than peripheral/ isolated adolescents. Thus, this study demonstrated that there were differences in physical self-concept between adolescents with different social status in peer cliques. The results of the present research showed that those adolescents who were more central to their clique had more positive physical self-concepts.

Previous studies allow to explain why adolescents with higher social status in their peer clique have more positive physical self-concepts. Adolecsents with high centrality in their peer cliques are the most popular clique members. At the same time previous studies (Eder, Evans, & Parker, 1995; Savin-Williams, 1979; Wang, Houshyar, & Prinstein, 2006) have demonstrated that, as a rule, popular adolescents with high social status among peers had more positive physical characteristics, such as athletic abilities, physical attractiveness, "ideal" body shapes, stylish clothes, grooming. It was also found that they were perceived by their peers as more favorable in terms of physical features (de Bruyn & van de Boom, 2005; Farmer & Rodkin, 1996; LaFontana & Cillesen, 2002; Prinstein, 2007). Adolescents with higher social status in peer groups observe their own physical behaviors and attributes, reflect expections and evaluations from peers and as a result develop more positive physical self-concepts.

Finally, the results showed that there were no differences in emotional and academic aspects of self-concept of adolescents with different social status in peer cliques. This finding allows us to think that adolescents with high social status in their peer clique do not have any salient emotional characteristics and academic achievements. Moreover, they are not perceived by other group members as more favorable in these terms. Therefore, they do not develop more positive emotional and academic self-concepts.

In summary, in this research it was found that adolescents with higher social status in their peer clique have more positive social self-concept in the area of relationships with peers, as well as more positive physical self-concept. Our explanation of these differences in self-concept of adolescents with different social status in peer groups is consistent with theoretical assumptions that a person's self-concept is formed through experience with and interpretations of one's enviroment (Bracken & Lamprecht, 2003; Harter, 1999, 2006; Marsh, 2007; Shavelson, Hubner, & Stanton, 1976). In other words, adolescents' social status and related behaviors and attributes, as well as the evaluative feedback from peers become the objects of their reflection and can affect their self-concepts.

The results of the present study are consistent with other researchers' findings which demonstrated a positive relationship between adolescents' self-concept and social status (Chambliss, Muller, Hulnick, & Wood, 1978; Chiu, 2001; De Bruyn & Van De Boom, 2005; Kolominsky,1976; Ļevina, Ivanova, & Jenenkova, 2012; Mārtinsone, 1998a, 1998b; Rosenberg, 1989; Valickas & Gippenreiter, 1989). However, these previous studies have found relations between adolescents' self-concept and social status in formal groups – school classes. In turn, the current research was focused on links between adolescents' self-concept and social status in peer cliques. Thus, this research expands our understanding of the relationship between multiple aspects of adolescents' self-concept and social status in informal peer groups.

Limitations of the Study and Implications for Further Research

A number of limitations need to be considered. First, although significant differences in self-concept between adolescents with different centrality in peer cliques were found, the nature of our data do not allow the determination of causation. On the basis of our data it is impossible to make any conclusions about the direction of the relationship between self-concept and social status. Longitudinal studies are needed to explore this issue.

In this study we investigated self-concept of adolescents with different social status in peer groups within classrooms. In the future it would be important to investigate links between adolescents' self-concept and their status in peer groups which exist outside school settings. Moreover, in the future it would be also valuable to analyze relations between adolescents' self-concept and their social status in all-male, all-female, and mixed-gender cliques separately.

The generalizability of the results to the Latvian population is limited because the sample differed from the general population of adolescents who are studying in the 9th grade in Latvia. The most significant difference is that only Russian speaking

participants were included. Second, all participants were studying in schools in the capital city of Riga. Participant from other towns of Latvia as well as from rural areas were not represented. It is necessary to take into account that the structure of classrooms and, as a result, composition of school-based peer groups in small towns and rural areas may differ from those in the capital city of Riga.

Taking into account, that participants of this research were students from secondary schools for the Russian minority, it would be also interesting to compare results of this research with results of similar empirical studies in Russia. However, examination of the available literature allows one to conclude that existing Russian empirical studies have focused on links between adolescents' self-concept and sociometric status in school classes, i.e. social status in formal groups. Thus, the results of this research can be interesting for Russian psychologists because it adds to the existing literature by explore the relations between multiple aspects of adolescents' self-concept and social status in informal peer cliques.

In sum, this study has demonstrated the importance of adolescents' experiences with peers for their self-concept. It has demonstrated that adolescents' social status in peer cliques is related to social and physical aspects of their self-concept. However, the above mentioned questions about self-concept of adolescents with different social status in peer groups remain to be addressed in future studies.

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