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**The Language of Extraversion:
Extraverted People Talk More Abstractly, Introverts Are More Concrete.**

Camiel J. Beukeboom, Martin Tanis & Ivar Vermeulen¹

¹VU University Amsterdam, The Netherlands

June 25, 2012

To appear in *Journal of Language and Social Psychology* (in press)

Corresponding author:

Dr. Camiel Beukeboom, Department of Communication Science, VU University Amsterdam,

De Boelelaan 1081, 1081HV Amsterdam, The Netherlands

E-mail: c.j.beukeboom@vu.nl

Abstract

To understand the impact of personality, one needs to know how personality differences manifest themselves in language use. The present study investigates the link between extraversion and language abstraction. Participants' spontaneous verbal utterances in face-to-face interactions were analyzed for language abstraction by applying the Linguistic Category Model, which distinguishes predicate types that convey information in concrete or interpretative manner. We also applied the Linguistic Inquiry and Word Count program (LIWC) to relate several word categories to extraversion and language abstraction. Results show significant positive correlations between extraversion and both language abstraction and self-reported level of interpretation. Language abstraction was also linked to LIWC variables (e.g., articles, numbers) previously shown to be related to extraversion. The findings suggest that the verbal style of extraverts is characterized by a higher level of abstract interpretation, whereas introverts tend to stick to concrete facts.

Keywords: Extraversion, Linguistic Category Model (LCM), language abstraction, Linguistic Inquiry Word Count (LIWC), linguistic style, communication, conversation.

The Language of Extraversion: Extraverted People Talk More Abstractly, Introverts Are More Concrete

Research has shown that personality differences bring about differences in language use (Fast & Funder, 2008; Pennebaker & King, 1999). Prior studies investigated the relationship between personality and language use in different types of text corpora ranging from emails (Oberlander & Gill, 2006), to personal narratives (Hirsch & Peterson, 2009), recordings of conversations (Mehl, Gosling & Pennebaker, 2006; Mehl & Pennebaker, 2003) and personal blogs (Yarkoni, 2010). Mostly using the Linguistic Inquiry and Word Count program (LICW; Pennebaker, Booth & Francis, 2007), these studies showed that the relative usage frequency of words from different categories differs between personality types. Extraversion, for instance, has been associated with more frequent use of words related to social processes, communication, family, and humans (Hirsch & Peterson, 2009), and individual words like drinks, restaurant, and dancing (Yarkoni, 2010).

It remains unclear, however, whether the observed differences reflect different personality types producing different content (i.e., *what* they talk or write about), or different style (i.e., *how* they talk or write). Because in most prior studies individuals are free to choose *what* to talk about, personality likely influences the content of the analyzed texts. For instance, since extraverts, compared to introverts, have more active social lives and seek out more social situations (Mehl et al., 2006), they are more likely to describe such situations. Consequently, their descriptions contain more references to people, social processes, and events (Hirsch & Peterson, 2009; Pennebaker & King, 1999; Yarkoni, 2010). Even though these findings demonstrate that personality traits are reflected in language use, they do not reveal whether personality in general, and extraversion in particular, affects *how* individuals express themselves in stylistic or structural aspects of their language use.

A structural aspect of language use that may relate to extraversion is the level of language abstraction as defined by the Linguistic Category Model (LCM; Semin & Fiedler, 1988). An extensive body of research shows that individual differences in language abstraction occur even when individuals describe identical events (e.g., Beukeboom, 2009; Beukeboom & Semin, 2006). One person may opt for a concrete and descriptive account, describing mainly visible behaviors and detail (using action verbs). Another person may opt for an interpretive account, providing subjective views of people and behavior, and describing things that are not directly visible (like feelings and traits). Previous LIWC-based findings suggest that introverts may use more concrete and descriptive linguistic styles than extraverts (Gill & Oberlander, 2002; Pennebaker & King, 1999; Yarkoni, 2010). Yet, this notion has not yet been empirically tested.

If, indeed, extraverts communicate more abstractly than introverts, this has extensive interpersonal consequences. Differences in language abstraction have repeatedly been shown to induce systematic effects on recipients' inferences. When information is reported concretely (using action verbs; e.g., Paul pays the cashier) a verifiable description of what happens is provided. When reported abstractly (using adjectives to describe traits; e.g., Paul is honest), information is interpreted and generalized from specific situations to enduring person characteristics (Semin, 2011). Differences in language abstraction not only affect how information is perceived and memorized by recipients, but also how conversations develop, the impression the speaker leaves, and how information is transferred to third parties.

The present study tested whether extraversion induces differences in language abstraction. All participants orally described the same social situations in a controlled setting. Based on previous findings, we expected introverts to stick to concrete descriptions and extraverts to provide more abstract interpretations.¹

Research on Extraversion and Language Use

The introversion-extraversion dimension is a factor of the Big Five Factor Model (Digman, 1990). Typical extraverts are sociable, gregarious, carefree, easy-going and optimistic. Typical introverts are quiet, introspective, reserved and retiring. Introverts exert seriousness, and like a well-ordered mode of life (Eysenck & Eysenck, 1964).

Research demonstrates that this personality dimension is not only reflected in patterns of thought, feeling and behavior, but also in communication features. For instance, extraverts speak faster (Koomen & Dijkstra, 1975), louder, and have a broader dynamic range (Scherer, 1979). In (mostly LIWC-based) studies on extraversion and verbal behavior, roughly four aspects are repeatedly observed. First, extraverts, compared to introverts, tend to use more words overall (Gill & Oberlander, 2002; Mehl et al., 2006). Second, extraverts differ from introverts in the content of their language. Extraverts show an increased use of words related to people and social processes (Hirsch and Peterson, 2009; Pennebaker & King, 1999; Yarkoni, 2010). Third, extraverts use more positive emotion words (Pennebaker & King, 1999; Yarkoni, 2010) and fewer negative emotion words (Pennebaker & King, 1999), which fits with the consistently observed correlation between extraversion and positive affect (Watson & Clark, 1997).

A fourth aspect of extraverts' language use relates to stylistic (or structural) language features, and is particularly relevant to our argument about language abstraction. A close analysis of the stylistic verbal aspects related to extraversion, as revealed by LIWC research, suggests that introverts tend to be more concrete and precise than extraverts: First, introverts have been shown to use more articles (e.g., a, the; Pennebaker & King, 1999), numbers, and quantifications (Gill & Oberlander, 2002; Yarkoni, 2010). Articles by definition refer to concrete objects or events (Pennebaker & King, 1999), and numbers and quantifications are specifications as well (Fast & Funder, 2008). Introverts also score higher on 'making

distinctions' (Pennebaker & King, 1999). That is, introverts' language contains more exclusive words (e.g., but, except), and negations (e.g., not, no), but less inclusion words (e.g., and, with), suggesting they are more reserved in assimilating information. Likewise, introverts use more tentative words (e.g., perhaps, maybe) and less certainty words (e.g., absolute, always) compared to extraverts (see also Dewaele & Furnham, 1999; Heylighen & Dewaele, 2002; Oberlander & Gill, 2006; Yarkoni, 2010). This suggests that introverts are more careful in their formulations.

Together, it appears introverts exert a more careful, precise and focused style, whereas extraverts exert a more imprecise and 'looser' style (Gill & Oberlander, 2002). This idea corresponds with evidence on the relation between extraversion and cognitive processing. Extraverts tend to show fast and less accurate performance in complex cognitive tasks. Introverts take more time, perform more accurately (Eysenck & Eysenck, 1985), and excel on tasks requiring focus, vigilance, and reflection (Harkins & Geen, 1975). Such differences in cognitive processing are likely to be reflected in language use. Previous research demonstrated that mood-induced differences in cognitive processing style yield differences in language abstraction. A negative mood-induced detail-focused analytic processing style results in more concrete language. A positive mood-induced global processing style results in more abstract language (Beukeboom, 2009; Beukeboom & de Jong, 2008; Beukeboom & Semin, 2006).

In sum, extraverts appear to—both verbally and cognitively—exhibit a more imprecise and 'looser' style with reduced concreteness, whereas introverts exhibit a more analytic, careful, and focused style. We therefore expected higher levels of extraversion to relate to increased levels of language abstraction as defined by the LCM (Semin & Fiedler, 1988). The LCM offers a taxonomy of predicate types, particularly relevant to descriptions of social situations. It distinguishes four linguistic categories with increasing levels of abstraction.

Most concrete are descriptive action verbs. These describe single, observable actions (e.g., ‘Jack talks to Sue’). Use of descriptive action verbs reflects a detail-focused, analytic processing style because it preserves perceptual features of the event. Most abstract are state verbs (e.g., Jack loves Sue) and adjectives (Jack is flirtatious), which describe behavior generally, provide a global summary of actions, and show no reference to specific acts. Use of more abstract predicates reflects an assimilative, interpretive processing style, since these words decontextualize events and convey interpretative accounts (Semin & Fiedler, 1988).

To test our hypothesis, we used the LCM taxonomy to analyze the abstraction of participants’ oral descriptions of social situations, and related results to participants’ independently obtained extraversion score. In addition, an LIWC analysis was conducted testing whether the previously mentioned word categories relate to extraversion and language abstraction.

Method

Participants and Design

A random sample of Dutch employees of a large company located in Amsterdam was approached by email; 40 (19 women) volunteered to participate. Ages ranged from 19 to 59 ($M = 34.4$ years, $SD = 8.55$). In a first session participants orally described five photos depicting a social situation; the descriptions (in Dutch) were later coded for language abstraction. Three days later, participants filled out a questionnaire measuring extraversion.

Procedure

On arrival, participants learned the study consisted of two independent studies; the current study on communication and one questionnaire to be administered three days later. Each participant was seated at a table opposite the experimenter and asked to orally describe five photos. Descriptions were tape recorded. All photos depicted ambiguous social situations with two or more people, and were presented on paper sheets in random order. The

experimenter gave the following instructions: “Please describe what you see in this picture. It is about the behavior of the depicted people. There are no right or wrong answers; it is about what you see.” During the participants’ descriptions the experimenter kept reactions to a minimum. Questions were responded to by merely repeating instructions. When participants appeared to be finished describing a photo the experimenter asked once whether they had anything to add. If not, the next photo was presented.

Immediately after, participants filled out a questionnaire using 7-point scales ranging from 1 = *not at all* to 7 = *very much*. First, they reported their *current mood* on two items: To what extent do you experience positive feelings (/ negative feelings) at this moment? ($M = 4.85$, $SD = 0.66$; $M = 2.20$, $SD = 0.91$ respectively).

Second, they reported their *task appreciation* (4 items; Cronbach’s $\alpha = .77$; $M = 5.16$, $SD = 0.98$), e.g.: How much did you enjoy describing the pictures?

Third, six items measured participants’ *self reported level of interpretation* in describing the photos ($\alpha = .77$; $M = 3.98$, $SD = 0.87$), e.g.: To what extent did you describe things that were not directly visible in the pictures? Finally, they reported some demographics.²

Three days later, participants filled out a paper questionnaire, measuring extraversion ($\alpha = .93$; $M = 3.43$, $SD = 0.64$) and neuroticism (cf. emotional stability) using the respective 40 items of the Five-Factor Personality Inventory (FFPI; Hendriks, Hofstee, De Raad & Angleitner, 1995).

Language abstraction. To analyze language use, recordings of participants’ spoken descriptions were literally transcribed ($M_{\text{number of words}} = 333$, $SD = 158$). All text used to describe people and their behavior was coded by a judge -blind to all participant variables- according to the LCM (Semin & Fiedler, 1988; see Coenen, Hedeboom & Semin, 2006 for guidelines). Each verb and adjective was coded and scored as follows: No. descriptive-action

verbs * 1, interpretive-action verbs/ state-action verbs * 2, state-verbs * 3, adjectives * 4.

Based on these scores, the mean level of abstraction was computed for each photo by adding the scores and dividing that by the total number of coded predicates (correcting for description length). The dependent variable was the mean level of abstraction for the five descriptions ($M=2.46$, $SD=0.38$). Scores varied between 1 (extremely concrete, only descriptive-action verbs) and 4 (extremely abstract, only adjectives). A random selection of the data (50%) was independently coded by a second judge to check for reliability. Agreement between the two judges was high: $r(20)=.91$, indicating a good reliability.

LIWC. In addition, we conducted a LIWC word count analysis using the Dutch dictionary in the LIWC2007 software (Pennebaker et al., 2007), which computes the percentage of words from different categories. We particularly looked at articles, numbers (numerals included), references to humans, and we computed a ‘making distinctions’ factor (Pennebaker & King, 1999) using the formula: discrepancies + exclusion words + tentative words + negations – inclusion words.

Results

Consistent with our hypothesis, extraversion correlated positively with coded language abstraction (see Table 1); the higher participants’ extraversion score, the higher their level of abstraction in describing the five photos. Moreover, extraversion correlated positively with self-reported level of interpretation. This provides complementary evidence that extraverts tend to use more abstract language than introverts, who use more descriptive and concrete language.³

Next, we analyzed several control variables that might explain the observed relations. Extraversion was unrelated to mood, task appreciation, number of words used, and length of the interview in seconds (r 's between $-.03$ and $.14$, $ns.$). Moreover, after adding these five variables as predictors to a linear regression of extraversion on language abstraction,

extraversion still significantly predicted language abstraction, $\beta=.44$, $t(33)=2.90$, $p=.01$. The same held when self-reported level of interpretation was the dependent variable, $\beta=.36$, $t(33)=2.52$, $p=.02$. Clearly, the control variables do not explain relations between extraversion and language use.

Looking at LIWC variables that were previously shown to be related to extraversion, we observed that use of articles, numbers, and specific references to humans, negatively related to language abstraction and self-reported level of interpretation (Table 1). Given that these elements reflect specifications in reference (e.g., the man, two kids, rather than “they”), these findings support the idea that extraversion is reflected in a stylistic dimension of language ranging from concreteness and precision, to abstraction and interpretation.

Notably, LIWC’s ‘making distinctions’ factor was unrelated to language abstraction, although it was related to self-reported level of interpretation. A look at the separate factor elements showed that two were significantly correlated to self-reported level of interpretation, namely ‘discrepancies’ (would, should, could; $r=.34$, $p=.03$) and ‘exclusive words’ (but, without, except; $r=.40$, $p=.01$). These elements possibly reflect explicit speculations about what the depicted actors think and why they do things (e.g., It could be..., I would think that..., but...). Such speculations may be described either concretely (e.g., He could be writing a letter) or abstractly (e.g., He could be lonely), which may explain why this factor is unrelated to language abstraction as measured by LCM. However, when judging their own level of interpretation in hindsight participants likely do consider whether they have speculated about things not visible in the pictures.

The correlations between extraversion and the other LIWC variables were in the expected direction, yet did not reach conventional levels of significance. This is likely due to the relatively small sample compared to previous studies in which these variables related significantly to extraversion.

Together, our results suggest that extraversion positively relates to a stylistic dimension of language with concreteness and precision on the one end, and abstraction and interpretation on the other end.

Discussion

The present findings revealed a relation between extraversion and language abstraction. Participants' verbal utterances when describing photos in face-to-face interactions were coded for language abstraction and related to participants' independently obtained extraversion score. Results showed a significant correlation; the higher participants' extraversion score, the higher their level of language abstraction. A complementary result was found for participants' self-reported level of interpretation. Moreover, we showed that both abstraction variables related to relevant stylistic LIWC variables that prior research associated to extraversion (Fast & Funder, 2008; Gill & Oberlander, 2002; Pennebaker & King, 1999). Particularly, an increased use of articles, numbers, specific references to humans, and (partly) 'making distinctions', co-varies with increased language concreteness. This suggests that introverts' linguistic style is relatively concrete and descriptive, whereas extraverts are more abstract and interpretative.

The findings are important because a large body of research shows the effects of language abstraction on the types of inferences that recipients draw (Semin, 2011). Abstract language conveys more information about the subjects' personality, and less about specific behavioral situations or contexts. As a result, abstractly described behavior (e.g., 'Camiel is unfriendly') appears more enduring, as more likely to be repeated, and is less verifiable. Concretely described behavior, in contrast (e.g., 'Camiel yells at Martin'), is more likely attributed to contextual causes, since it maintains a reference to a concrete empirical event (Semin & Fiedler, 1988). Recent research also showed that increasing linguistic concreteness positively impacts judgments of truth (Hansen & Wänke, 2010). Thus, an introvert's

linguistic style would induce more situational attributions and a higher perception of trustworthiness than an extraverts' style.

Next to influencing how information is perceived and memorized by recipients, linguistic styles likely also influence how conversations develop, the impression speakers leave, and subsequent representation of information to third parties. Research showed that conversations between two introverts are more serious, and have a greater topic focus (i.e., discussing one topic in-depth), while conversations between extraverts are more expansive, and characterized by a wider range of topics (Thorne, 1987). Differences in linguistic style may thus feed through to the course of conversations.

One interesting topic that future research may address pertains to possible underlying mechanisms. First, extraverts have been shown to tend towards fast and less accurate performance in cognitive tasks, whereas introverts tend to take more time and are more careful and accurate (Eysenck & Eysenck, 1985; Harkins & Geen, 1975). In conversations this would result in introverts being more thoughtful, reflecting more before speaking, which is in line with introverts' lower speech rates (Koomen & Dijkstra, 1975). Increased reflection would make introverts' speech style more precise but also less fluent and spontaneous (Heylighen & Dewaele, 2002).

Second, by definition extraverts and introverts differ in how they behave in interpersonal situations. Prior research suggests that introverts behave more cautiously because of fear of punishment (Eysenck & Eysenck, 1985). Using concrete descriptions could be regarded as cautious verbal behavior because these are less likely to induce disagreement than abstract descriptions (Semin & Fiedler, 1988). While introverts may stick to the facts out of fear of disagreement (Thorne, 1987), typical extraverts are excitement-seekers (Eysenck, 1981), and may be less hesitant to provide subjective interpretations. They may even use abstract interpretations to encourage more lively conversations (Thorne, 1987).

To conclude, our study is the first to link extraversion to language abstraction as defined by the LCM (Semin & Fiedler, 1988), and additionally links language abstraction to several LIWC variables previously related to extraversion. Our results suggest that extraversion induces stylistic differences in language use that show even when describing the exact same content. By talking at different levels of abstraction, extraverts and introverts report information differently, and induce different recipient inferences, memories and subsequent representations of the information exchanged.

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Table 1.

Correlations between Extraversion, language abstraction, self reported level of interpretation, and LIWC variables.

<i>Measure</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
1 Extraversion	1	.35*	.33*	-.30†	-.21	-.13	.02
2 Language abstraction		1	.28†	-.35*	-.40*	-.46**	.02
3 Self reported interpretation			1	-.46**	-.62**	-.65**	.43**
4 Articles				1	.43**	.28†	-.24
5 Numbers					1	.69**	-.45**
6 Humans						1	-.46**
7 Making distinctions							1

Note. $N = 40$. * $p < .04$; ** $p < .01$; † $.05 > p < .1$

Acknowledgements

We would like to thank Pluk Bakker for collecting the data.

Footnotes

1. We conceptualized and measured extraversion as a continuous dimension rather than a dichotomous classification. For the sake of brevity, however, we use the terms “extravert” and “introvert” to refer to individuals who are relatively high or low on the extraversion dimension.
2. The full questionnaire is available on request at c.j.beukeboom@vu.nl.
3. Together with extraversion we also administered neuroticism. This variable showed no relations with our measures of language use, it was negatively correlated with extraversion, $r(40) = -.45, p = .003$.

Bios

Camiel Beukeboom is an assistant professor at VU University, Amsterdam, the Netherlands at the department of Communication Science. His research focuses on interpersonal communication and language use, with a specific focus on linguistic bias and the antecedents and consequences of language abstraction and negation use.

Martin Tanis is an assistant professor at VU University, Amsterdam, the Netherlands at the department of Communication Science. His research focuses on online social behavior and communication with a special interest in intra- and intergroup processes.

Ivar Vermeulen is an assistant professor at VU University, Amsterdam, the Netherlands at the department of Communication Science. His research focuses mostly on implicit processes in persuasive and group communication.