

9 Personality and Self-Esteem in Social Interaction

Gudberg K. JONSSON

Abstract. There is a long-standing interest in hidden temporal patterns in behavior. The current chapter discusses the idea that face-to-face interaction can be construed as having a definite organization or structure, just as language is understood in terms of its grammar. The participant has, within that organization, options he can exercise, including the option of violating aspects of the organization. Numerous studies, using the T-pattern detection algorithm, have demonstrated that the organization of behavior is influenced by situation, personality and culture. Strong relationships have been found between the structure of verbal and non-verbal communication and cognition and social adaptation. Little research exists though on the relation between real-time behavior organization and self-esteem and personality. An earlier study suggests a strong relationship between level of subject's self-esteem and number of real-time behavioral patterns produced in dyadic interaction situations. Significant differences have also been found in real-time behavioral patterns produced in dyadic interactions between subjects who considered themselves to be friends versus those who were strangers. It is unknown whether such behavioral analysis would reveal a difference in real-time patterns produced by persons with different scores on the Eysenck Personality Questionnaire. These ideas have been tested by analyzing twenty-four dyadic interactions between male students. A special software, THEME, was used to detect real-time patterns in real-time behavior records. Results indicate that these interactions are highly synchronized and structured. Strong correlation was found between subjects' self-esteem and complexity and frequency of behavioral patterns detected. Positive correlation was also found between subject's personality and complexity and frequency of patterns. Certain pattern types were found exclusively to be produced by extraverts and other by introverts. High and low self-esteem subjects' were also found to produce different types of behavioral patterns.

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9.1. Introduction

9.1.1 Behavior and Patterns

Our universe is full of patterns. Every night the stars move in circles across the sky and the season's cycle at yearly intervals. Our hearts and lungs follow rhythmical cycles whose timing is adapted to our body's needs. Many of nature's patterns are like the heartbeat: they take care of themselves, running "in the background." Once we have learned how to identify the patterns, exceptions start to stand out. Using mathematics to organize and systematize our ideas about patterns, we have already discovered that nature's patterns are not just there to be admired; they are vital clues to the rules that govern natural processes [1].

Considering the everyday world of face-to-face encounters, the commonplace activities in these encounters - greeting, discussing, joking, bargaining, directing, and the like - make up the fabric of an individual's social world. Individuals of all societies move through life in terms of a continuous series of social interaction. It is in the context of such social encounters that the individual expresses the significant elements of his culture, whether they are matters of economics, social status, personal values, self-image, or religious belief.

It can be argued that goal of psychology is to discover the scientific viable constructs or categories that will characterize what is variant and invariant in the working of the human mind. Psychologists, like all scientists, model variance. By observing people's thoughts, feelings, or behavior in some sort of controlled or measured environment, psychologists turn those observations into numbers by some recording method, and then examine the numbers to provide a description of what was occurring in the minds of the people who were studied [2].

Much has been written for professional and popular audiences about interpersonal interaction and about specific actions that occur in these encounters. These have included both insightful commentaries based upon general observation and investigations of single behaviors [3]. But what is communication? There are numerous definitions and the differences between them clearly demonstrate the difficulty of describing the communication structure. A theory able to address all the features of the communication process is still lacking. The earliest communication frameworks were based on the process of signal transmission in telecommunication systems. Shannon and Weaver's model, still the best known and most widely used, fails to take account either of the specifically linguistic features of verbal language or of the sense-making of the communicative processes [4]. Given the difficulties of these models, some theorists have taken another approach by differentiating between standard communication and miscommunication. According to Anolli [5], miscommunication does not only include its standard meaning such as a lacking, defect and violation of communication rules, but also mismatching interpretation as well as misrepresentation of information. And studying miscommunication, as a part of the communication process, should not only consider the negative aspects but also the positive ones.

There is a long-standing interest in hidden or non-obvious temporal patterns in behavior in various areas of behavioral research [6-8] and it is now a common believe that human interaction is much more regular than has yet been reported. In the opening words of his book *Ethology: The biology of behavior*, Eibl-Eibesfeldt [9] argues that behavior is composed of patterns in time and that investigation of

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behavior deal with sequences that are, unlike bodily characteristics, not always visible. An integrated study of the structure of verbal and nonverbal behavior has also been repeatedly proposed [e.g. 10, 11]. But regardless of this believe and growing interest in studying the organization or structure of behavior it might come as a surprise to many that only about 8% of all psychological research is based on any kind of observation. Only a fraction of that research is programmatic research, and a fraction of that sequential in its thinking [12].

Numerous studies, using the T-pattern detection algorithm [6-8], have demonstrated that the organization or structure of behavior, both verbal and non-verbal, is influenced by variables such as situation, personality and culture. And a strong relationship has been found between the structure of verbal and non-verbal communication and cognition and social adaptation [e.g. 13-29].

Little research exists on the relation between real-time behavior organization and self-esteem and personality. An earlier study suggests a strong relationship between level of subject's self-esteem and number of real-time behavioral patterns produced in dyadic interaction situations [17, 18]. Jonsson also reported finding significant differences in real-time behavioral patterns produced in dyadic interactions between subjects who considered themselves to be friends versus those who were strangers, the level of patterning being much higher between friends. It is unknown whether such behavioral analysis would reveal a difference in real-time patterns produced by persons with different scores on the Eysenck Personality Questionnaire.

9.1.2 *The Person Situation Debate*

The fundamental issues of the variant vs. invariant in personality have recurred in different forms and under various labels for the past several decades. The most common of which is the "*person situation debate*" [30]. This translates into a concern over whether the behavior of a person is consistent (invariant) enough across time and situations to be usefully attributed to individual characteristics [29]. The other possibility is that behavior is so inconsistent (variable) that only the situation matters.

The person-situation debate has generated no shortage of arguments, but directly relevant data remain scarce. To yield relevant data, the behavior of a sample of subjects must be directly measured in more than one situation, so that their consistency can be assessed. Direct behavioral measurement is difficult and expensive and for that reason has been rare in personality research [31]. Repeated behavioral measurement has been even rarer. And apart from those reported in this chapter no research seems to exist on the temporal structure of behavior and how it transforms between situations. The recent literature includes signs that this may be starting to change [e.g. 32, 33], which is good, because when behavior is directly measured on more than one occasion, illuminating analyses become possible.

Funder and Colvin [34] observed hundred and forty undergraduate subjects in two experimental situations. In the first, two undergraduates of the opposite sex who had never met before were shown into a small room containing little except a couch and a video camera. They were told that they could "talk about whatever you like," and that someone would be back in a few minutes. The second situation occurred a few weeks later, and was exactly like the first, except that each subject was paired with a different opposite-sex partner, both of whom were there for the second time. Even though results demonstrated that the situation amounted to a kind of getting-

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acquainted conversation, within that limit there were great variations across individuals. At the first session trained independent raters, using the Riverside Behavioral Q-sort [35] rated the subject's behavior as relatively awkward, tense, disinterested, distant, insecure, and fearful. In the second session, behavior was observed to have become more relaxed, socially skilled, interesting, expressive, fluent, and all-around enjoyable. It should not be hard to explain these results. In the second session subjects are at much more ease, already familiar with the situation, the environment had transformed itself from one that was strange/unpredictable to one that felt more comfortable. Overall, 20 of the 62 behavioral items observed changed between the two sessions, all of which are consistent with the interpretation [29]. The evidence offered here demonstrates how seemingly small changes in situation can have major psychological importance.

These results might imply that the influence of personality on behavior is low. However, the influence of personality is reflected in individual differences in behavior and thus requires a separate analysis. Calculating correlations between individuals' behavior at *Time 1* and *Time 2*, Funder [29] reported consistencies were numerous. Subjects were consistent in the relative degree to which they spoke loudly, acted timidly, laughed, smiled, and were expressive, awkward and enthusiastic. So these seemingly similar situations turned out to be psychologically very different. People felt differently between them and changed their behavior accordingly. Funder's results also suggest that the more similar a person rated the two situations, the more consistently the subject behaved across them. This suggests that the "same" two situations can differ in how similar they seem to different participants.

It can be argued that situations are under-studied but the matter is even worse when it comes to behaviors. Only a few attempts have begun to address the question of how to think about differences between different kinds of behavior. Skinner [36] and McClelland [37] argued that it was important to differentiate between "operant" and "respondent" behaviors. Operant behaviors should be more consistent across situations than are their respondent behaviors. This was confirmed by Furr and Funder [38] gathering ratings of behaviors as to the degree to which they were "automatic", e.g. laughing, as opposed to "controlled", e.g. offering advice. Over all the behaviors assessed, ratings of the degree to which a behavior was automatic as opposed to controlled correlated with cross-situational consistency with an $r = .50$.

9.1.3 Self-Esteem

Looking at the research history on self-concepts, it seems there is no topic that has been more studied than self-esteem. Most probably this is the case because low self-esteem is a vulnerability that has been linked to susceptibility to mental illness, relationship dissatisfaction, and even physical illness [e.g. 39-41].

There is no shortage of ways to define self-esteem. Perhaps the simplest one is found in the New Webster's Dictionary [42], which says that self-esteem is "satisfaction with oneself." In psychology, self-esteem or self-worth includes a person's subjective appraisal of himself or herself as intrinsically positive or negative to some degree [43]. Generally, self-esteem is described as a personal evaluation that an individual makes of her or himself, their sense of their own worth, value, importance, or capabilities [44, 45]. Though the descriptions of different levels of self-esteem might sound a little general most would probably agree on that self-

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esteem could be regarded as a filter mechanism. As such, it plays a significant part in how we generally perceive the world and hence how we behave.

It can be assumed that self-esteem could be construed as a permanent characteristic (trait self-esteem) or as a temporary psychological condition (state self-esteem). Traits are often conceptualized as dispositional forces that create consistency in individuals' experiences and actions; as such they carry the past into the present and across the diverse circumstances. According to Robinson and Cervone [46] this perspective has two limitations. First, the predictive value of global trait constructs can sometimes be surprisingly low. Second, the explanatory value of the trait construct is potentially limited.

There are at least two types of consistency are to the trait construct: consistency across situations and over time [46]. Efforts to explain cross-situational consistency have been to some extent successful. We would for example expect people to be more consistent across situations to the extent that they appraise or categorize diverse situations in a similar manner [47].

People's self-evaluation, whether explicit or implicit, are presumably formed through interaction with significant others. According to theories in the tradition of symbolic interactionism, people develop a sense of self on the basis of how other people treat them, and according to the sociometer theory of self-esteem, people's self-esteem is formed through their interactions with others [48]. Individuals with low self-esteem have been reported to have repeatedly experienced perceived interpersonal rejection. Conversely, people with high self-esteem have experienced many subjectively successful or non-rejecting interpersonal relationships [48].

Self-esteem has been studied in relation to many different variables, e.g. violence, drug abuse, bullying, relationships and academic achievement. From the late 1960s to the early 1990s it was assumed that a student's self-esteem was a critical factor in the grades that they earn in school, in their relationships with their peers, and in their later success in life. That being the case, many American groups created programs to increase the self-esteem of students, assuming that grades would increase, conflicts would decrease, and that this would lead to a happier and more successful life [49]. Recent studies indicate that inflating students' self-esteem in and of itself has no positive effect on any objective aspect of their lives. One study has shown that inflating self-esteem by itself can actually decrease grades [50]. Global self-esteem has also be positively correlated with extraversion and negatively with neuroticism [51] and therefore has particular relevance to experiences of subjective well-being.

9.1.4 Personality

It is evident that there are individual differences in social behavior. People have traditionally been distinguished in terms of such personality traits as extroversion or dominance. According to the Columbia Encyclopedia [52] personality refers to the patterns of behavior, thought, and emotion unique to an individual, and the ways they interact to help or hinder the adjustment of a person to other people and situations.

Numerous theories have attempted to explain human personality. In recent years, trait theories have arisen with the object of determining aspects of personality that compel an individual to respond in a certain way to a given situation. Objections to trait theories point out that behavior is largely situation dependent, and that such traits as "honesty" are not especially helpful in characterizing personality and behavior. Despite such objections, trait theories have been popular models for

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quantifying personality [52]. Eysenck [53] has proposed three fundamental dimensions of personality: extroversion-introversion, neuroticism, and psychoticism. Extroversion-introversion includes the trait of sociability, which can also be related to emotion (e.g., interest, as expressed toward people, versus shyness). Neuroticism includes emotionality defined, as in temperament theory, as nonspecific negative emotional responsiveness.

According to Eysenck's Personality Inventory test, an introvert is associated with controlled behaviors, seriousness, pessimistic and reliability. He does not act on impulse nor does he like excitement. An extrovert, on the other hand, is associated with sociable tendencies, optimistic, aggressiveness and impulsive behaviors. He does not keep his feelings under control nor does he like to do things by himself [54, p.180]. Extroverts appear to be more open to change their judgments under the influence of prestige suggestions. However, when an introvert encounters an extrovert with different views on a controversial issue, the introvert is more likely to be persuaded to modify his position [54, p.205].

Studies on differences in communication style between extraverts and introverts, suggest that people who are extraverts speak more rapidly, using higher pitch, and give more feedback than introverts [55, 56]. Introverts have also been found to be more likely to take the role of the "interviewer" in dyadic situations [56]. According to Argyle [57] several studies have confirmed that extraverts gaze more frequently, with longer glances, especially while talking, than introverts.

9.1.5 Objectives and hypotheses

The object of the current pilot research is to search for a particular type of repeated behavior patterns, both intra- and inter- individual, and relate the patterns to self-esteem and personality types. The search was based on a method developed by Magnusson [e.g. 6-8] to detect real-time behavior patterns using a system of computer software, called THEME. The research combines two different approaches "structural" and "external" [3]. While the structural approach attempts to discover the sequential structure of social systems, the external variable approach is concerned with individual and group differences in behavior as a function of external variables, here self-esteem and personality.

9.2 Method

9.2.1 Participants

Twenty-four pairs of male students at the University of Iceland, aged 20-26 (mean 22,5 years), participated in the study.

9.2.2 Procedure

The students were informed that they would participate in a filmed interview about the major qualities and faults of the Icelandic Educational System. They were given 10 min to prepare for the interview. The 10 min long preparation time was recorded with a video camera.

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9.2.3 Measures

The Rosenberg [44] Self-Esteem Scale (RSE) and the Eysenck Personality Questionnaire [52] were demonstrated to all subjects prior to the video-recorded sessions. A self-esteem score between 10-20 indicates low self-esteem, 21-30 indicates moderate self-esteem, and a score between 31-40 indicates high self-esteem. EPQ scores on the extraversion dimension can range from 0-12 where high scores indicate extraversion and low scores introversion.

ThemeCoder, a multi-media module of the THEME computer software, was used to code behavior events frame by frame, using digitized video recordings. Following the coding, THEME was used to detect and analyze behavior patterns.

Verbal behavior was coded according to a system designed by Bromberg and Landré [58] (see Appendix A), and non-verbal behavior was coded using McGrew's category system [59], further developed by Jonsson [18], studying the relation between self-esteem, friendship and the temporal structure of verbal and non-verbal interaction (see Appendix B).

9.2.4 Inter-observer reliability

Estimates of inter-observer reliability were calculated using the formula (McGrew 1972, p. 24):

$$\frac{\text{No. of agreements (A + B)}}{\text{No. Of agreements (A + B) + No. seen by B only + No. seen by A only}}$$

Standards for inter-observer reliability are not uniform, but agreement below .70 was regarded as unacceptable. Two observers were randomly assigned one minute clips from each dyad. The inter-observer reliability scores was 0.74 for all classes of behavior, but over .85 for "looking behavior" and "verbal behavior".

9.2.5 Independent observers

Two independent observers were asked to estimate the level of subject's self-esteem and personality dimensions of extraversion, using a 5 point Likert Scale, by watching selected video recordings. The scores were compared to the actual scores of participants and their level of patterning in the interaction process.

9.2.6 Temporal Pattern Analysis

Underlying the THEME method [e.g. 6-8] is a structural model that is concerned with the temporal organization of verbal- and non-verbal behavior. THEME detects regular, hierarchical real-time behavior patterns, where large patterns are composed of smaller ones, somewhat like phrases in language are made out of words that again are patterns of phonemes, etc.

A Temporal pattern (T-Pattern) is essentially a combination of events where the events occur in the same order with the consecutive time distances between consecutive pattern components remaining relatively invariant with respect to an expectation assuming, as a null hypothesis, that each component is independently

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and randomly distributed over time. As stated by Magnusson ‘that is, if A is an earlier and B a later component of the same recurring T-pattern then after an occurrence of A at t , there is an interval $[t+d_1, t+d_2]$ ($d_2 \geq d_1 \geq d_0$) that tends to contain at least one occurrence of B more often than would be expected by chance’. The temporal relationship between A and B is defined as a critical interval and this concept lies at the centre of the pattern detection algorithms.

Through use of the Theme 5.0 software package, pattern detection algorithms can analyze both ordinal and temporal data however, for the algorithms to generate the most meaningful analyses the raw data must be time coded i.e. an event must be coded according to time of occurrence as well as event type. The method of time-motion computerized video analysis therefore lends itself to the use of T-Pattern detection and through use of the Bloomfield Movement Classification detailed and highly complex patterns that are specific to the performance of competition can be identified.

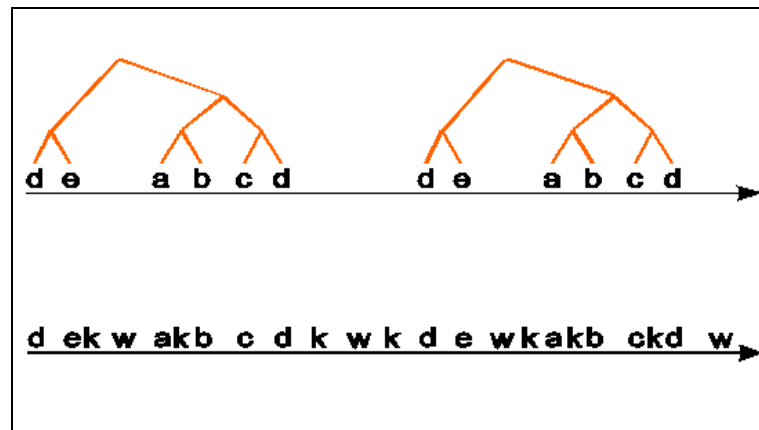


Figure 1. The lower part of this figure shows a simple real-time behavior record containing a few occurrences of several event types, a, b, c, d, & e, indicating their respective instances within the observation period. The upper line is identical to the lower one, except that occurrences of k and w have been removed. A simple t-pattern (abcd) then appears, which was difficult to see when the other events were present.

9.3 Results

The proportion of different behavior patterns subjects participated in, relative to all patterns, correlated positively with self-esteem ($r = .66$; $p < .05$). The proportion of pattern occurrences subjects participated in, relative to all patterns, also correlated positively with self-esteem ($r = .67$; $p < .05$) (see Figure 2).

This indicates that behavior emitted by subjects with high self-esteem was more patterned than the behavior of those with moderate self-esteem (none of the participants scored low on the self-esteem scale).

The type, frequency and duration of behavioral events emitted differed between the high and moderate self-esteem subjects. High self-esteem subjects emitted more verbal events and feedback and hesitated less during their speech. They looked more

frequently at their partner, with longer glances, and talked for a greater percentage of the time than subjects with moderate self-esteem.

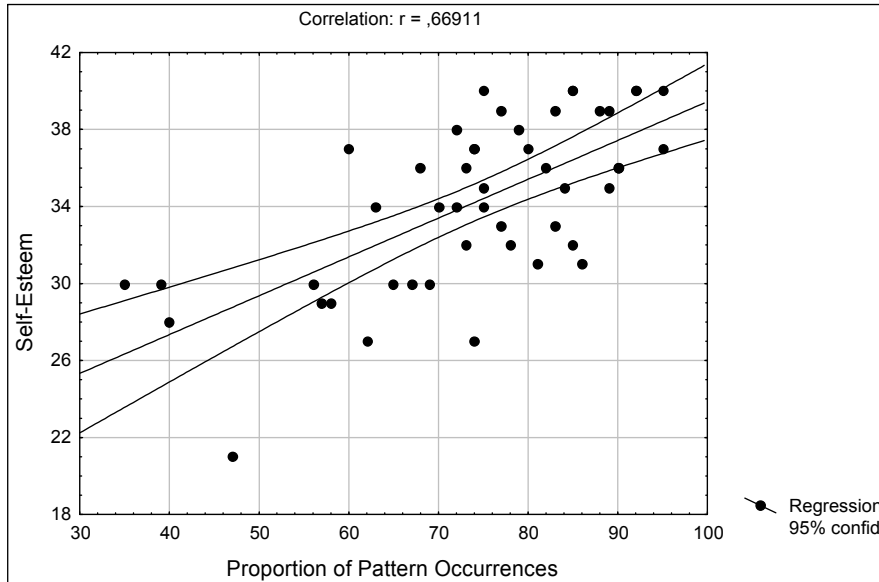


Figure 2. Correlation between Self-Esteem and Proportion of Pattern Occurrences

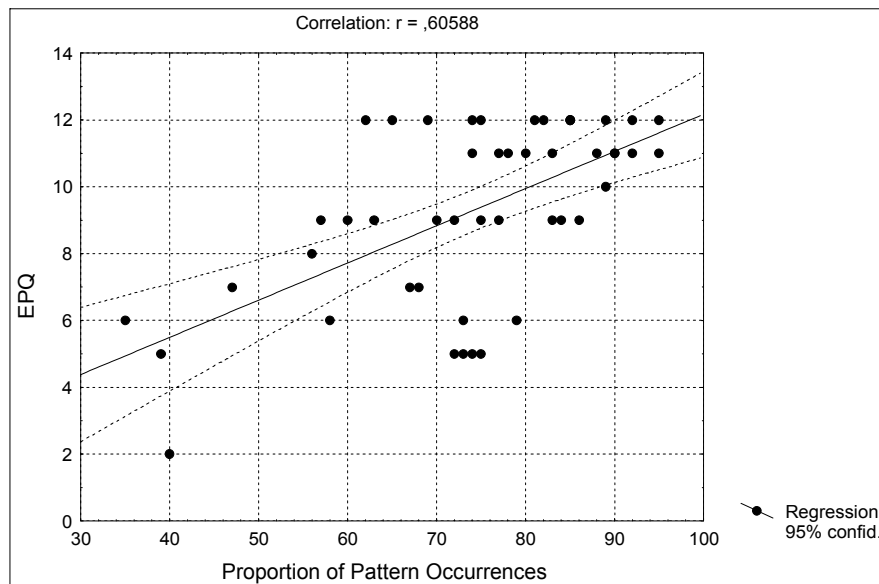


Figure 3. Correlation between EPQ scores and Proportion of Pattern Occurrences

No difference was detected in number of different types of behavior emitted by high and moderate self-esteem subjects, but the frequency of events emitted was higher for high self-esteem subjects.

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Scores on the EPQ were positively correlated with proportion of pattern occurrences that each individual participated in ($r = .60$; $p < .05$) (see Figure 3). These findings indicate that individuals who scored high on EPQ (extraverts) participated more frequently in detected patterns than those who scored low on the EPQ (introverts). Introverts on the other hand seemed to participate in a larger variety of pattern types.

Extraverts produced longer patterns and more patterns including gesticulation than introverts, even though extraverts did not gesture more in general. Introverts, on the other hand, produced more patterns including adaptations (adjusting cloths, hair, etc.) and certain types of verbal patterns (ask & answer) than extraverts.

Introverts, on average, looked less at their partner than extraverts and with shorter glances, and also talked for a lesser percentage of the time. Extraverts hesitated less and provided more verbal feedback. Overall there was no difference detected in number of different types of behavior emitted by intro- and extraverts, but the frequency of events emitted was higher for extraverts.

Introverts with high self-esteem (EPQ scores ≤ 6 , RSE scores 31-40) participated in a higher proportion of detected patterns than introverts with moderate self-esteem (EPQ scores ≤ 6 , RSE scores 21-30) ($t = -9.8$; $df = 9$; $p < .001$) (see Figure 4).

Extraverts with high self-esteem (EPQ scores ≥ 7 , RSE scores 31-40) participated in a higher proportion of detected patterns than extraverts with moderate self-esteem (EPQ scores ≥ 7 , RSE scores 21-30) ($t = -4.9$; $df = 35$; $p < .001$) (see Figure 5.).

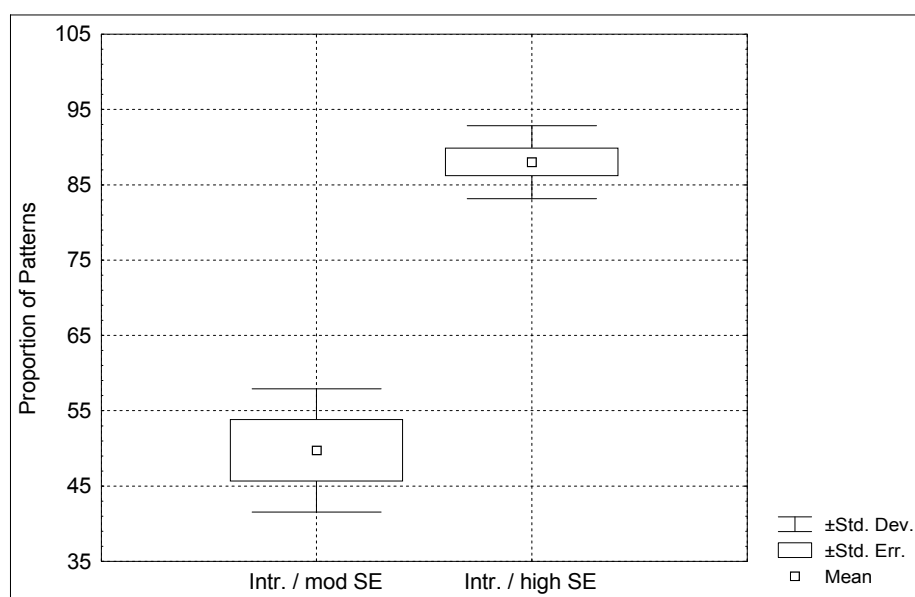


Figure 4. Pattern participation of introverts with high and moderate self-esteem

On average 418 (min=46, max=1139, S.d.=309) different pattern types were detected in the 24 dyads (mean occurrence=2208, min=262, max=5356, S.d.=1535). The maximum length of patterns was on average 14,5 (min=4, max=34, S.d.=6.3) (mean maximum level=6.6, min=3, max=9, S.d.=1.6).

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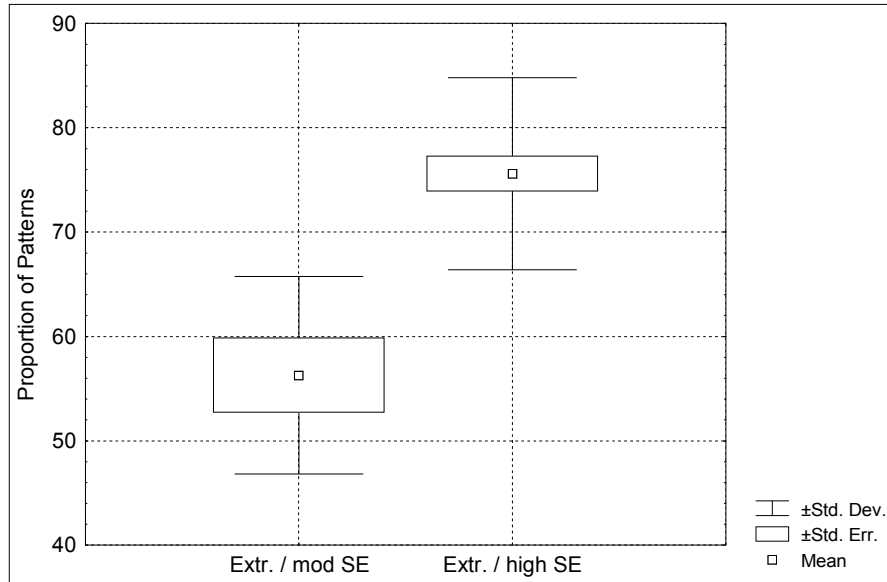


Figure 5. Pattern participation of extraverts with high and moderate self-esteem

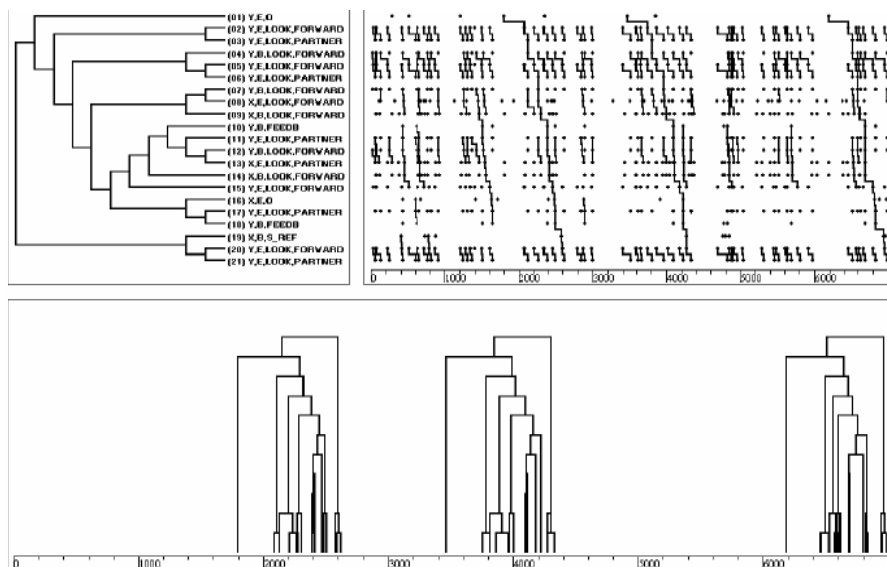


Figure 6. Two introverts (*X & Y*) with *high* self-esteem [The pattern figure has three main parts, each involving the same observation period. The upper-left box shows the hierarchical construction of the pattern, whereas the upper-right box shows the occurrence time points of each of its event types and the connection of points to form pattern occurrences. The bottom-box is like the upper-right box but with only complete pattern instances showing]. Events - (01) Y, end (e), expressing opinion; (02) Y,e, look forward; (03) Y,e, look partner; (04) Y, begin (b), look forw; (05) Y,e, look forw; (06) Y,e, look partn; (07) Y,b, look forw; (08) X,e, look forw; (09) X,b, look forw; (10) Y,b, oral feedback; (11) Y,e, look partn; (12) Y,b, look forw; (13) X,e, look partn; (14) X,b, look forw; (15) Y,e, look forw; (16) X,e, expressing opinion; (17) Y,e, look partn; (18) Y,b, oral feedback; (19) X,b, referring to himself; (20) Y,e, look forw; (21) Y,e, look partn - ($p < .001$).

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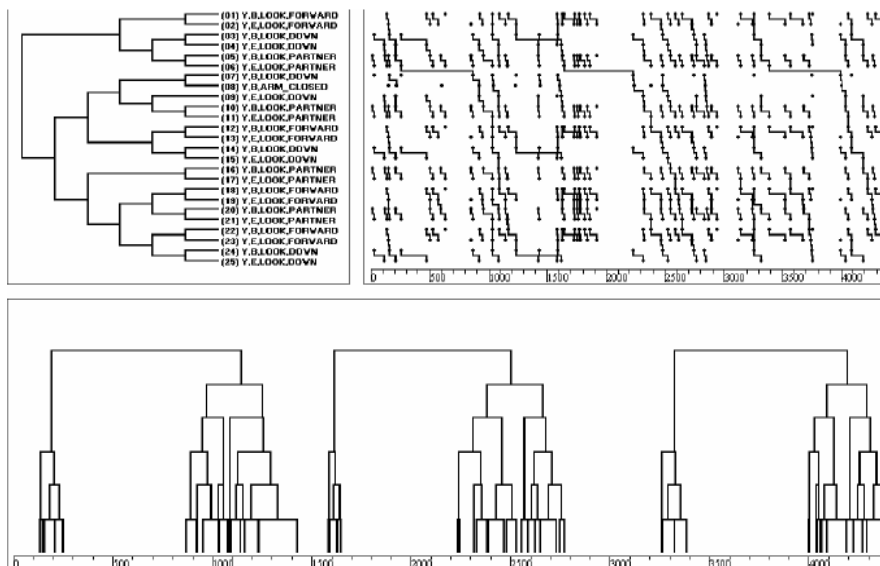


Figure 7. Extrovert (Y) with high self-esteem. Events - (01) Y, begin (b), look forward; (02) Y, end (e), look forw; (03) Y,b, look down; (04) Y,e, look down; (05) Y,b, look partn; (06) Y,e, look partn; (07) Y,b look down; (08) Y,b, arm open; (09) Y,e, look down; (10) Y,b, look partn; (11) Y,e, look partn; (12) Y,b, look forw; (13) Y,e, look forw; (14) Y,b, look down; (15) Y,e, look down; (16) Y,b, look partn; (17) Y,e, look partn; (18) Y,b, look forw; (19) Y,b, look forw; (20) Y,b, look partn; (21) Y,e, look partn; (22) Y,b, look forw; (23) Y,e, look forw; (24) Y,b, look down; (25) Y,e, look down - ($p < .001$).

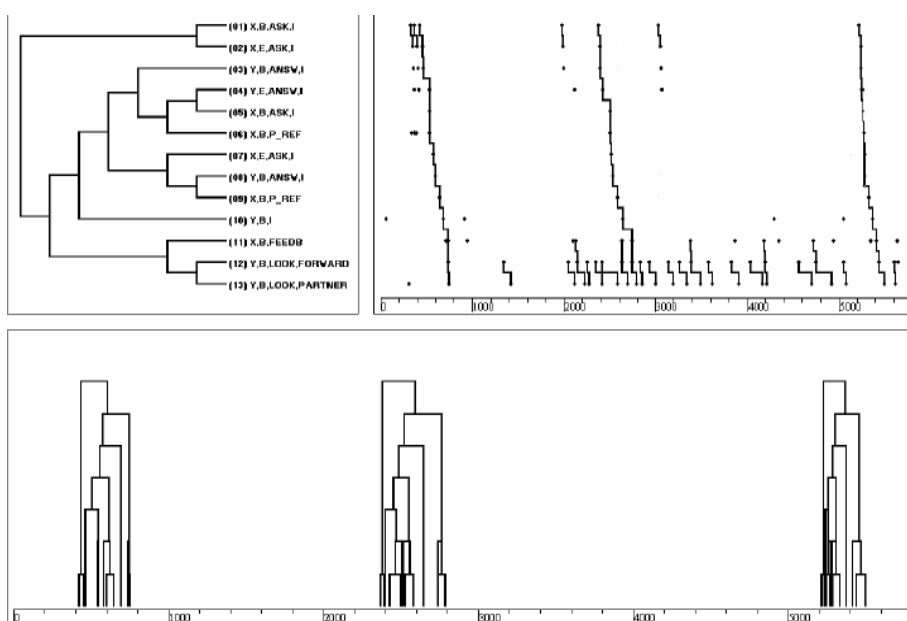


Figure 8. Two extroverts (X & Y) with high self-esteem. Events - (01) X, begin (b), ask for information; (02) X, ends (e), ask for information; (03) Y,b, answer; (04) Y,e, answer; (05) X,b, ask for information; (06) X,b, referring to partn; (07) X,e, ask for information; (08) Y,b, answer; (09) X,b, referring to partn; (10) Y,b, give information; (11) X,b, oral feedback; (12) X,b, look forw; (13) Y,b, look partn - ($p < .001$).

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Subjects participated, on average, in 72.4% of detected pattern types (min=40, max=94, S.d.=14) and in 74.1% of pattern occurrences (min=35, max=95, S.d.=14.4).

Pattern occurrences were higher in dyads where both individuals scored high on the self-esteem scale than in mixed dyads (high vs. mod. self-esteem). Both “high self-esteem” and “extravert” dyads produced on average longer patterns than mixed dyads. Certain pattern types were found exclusively to be produced by extraverts and others by introverts. High and moderate self-esteem subjects were also found to produce different types of behavioral patterns (see examples in Figures 6, 7 and 8). Significant differences were found between scores from independent observers and actual scores from subjects; $F(4,98)=2,967$ $p<0,05$ for self-esteem, and $F(4,99)=5,896$ $p<0,05$ for personality dimension of extraversion. The observers were more successful identifying extroverts with high self-esteem and introverts with average self-esteem than extroverts with average self-esteem and introverts with high self-esteem. None of the observers correctly identified all subjects observed according to their scores on the inventories.

9.4 Discussion and conclusion

The number, frequency and complexity of detected patterns, indicates that behavior is even more synchronized than the human eye can detect. This synchrony was found to exist on different levels, with highly complex time structures that extended over considerable time spans where many of the patterns occurred in a cyclical fashion. The results indicate a strong relation between self-esteem, personality and complexity and frequency of behavioral patterns. Certain patterns were found exclusively to be produced by extraverts and introverts, and others by high and moderate self-esteem subjects.

How can the difference between introverts and extraverts, and high and moderate self-esteem subjects, described in the results, be explained? Self-esteem is a concept that describes a general feeling of own worth. As such it might affect both social skills and the desire to communicate. The type and amount of behavior emitted by extraverts and subjects with high self-esteem differed from behavior emitted by introverts and subjects with a moderate self-esteem. This could explain different types of patterns produced, as well as differences in pattern frequency.

Extraverts and high self-esteem individuals might also be the “time giver”, that is, the external stimulus the other person has to synchronize his behavior with. Extraverts and high self-esteem individuals could then, to some extent, control pattern production. Possible functions of synchronization might be found in mutual understanding; the higher the degree of synchronization, the higher the degree of mutual understanding. Synchronization might also serve as an indicator of compatibility in interactions. The amount of synchronization that can be achieved would thus be the indicator of compatibility by interactants [20].

Haynal-Reymond, Jonsson, & Magnusson [22], analyzing behavioral patterns in patient-doctor interaction, reported that the Theme pattern analysis was more successful in predicting future suicide attempts, by patients who had already tried taking their own life, than evaluations from their trained therapists. The current results suggest that the Theme pattern analysis might also be more successful in

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identifying the level of subject's self-esteem and scores on extraversion/introversion than independent observers.

Identifying and explaining trait-related consistencies remains a scientific challenge. While two situations may at first seem only slightly different, on a psychological level the difference can be powerfully important, with observable effects on behavior. But it is difficult to identify just how situations are important. This is partly because of the common practice of assigning "the situation" responsibility for all the behavioral variance not accounted for by a particular personality trait.

The results of the current study suggest that when behavior is analyzed using advanced methods like the T-pattern detection algorithm, illuminating analyses become possible.

Numerous studies have demonstrated that the organization of behavior is influenced by situation, personality and culture. Significant differences have been found between the structure of verbal and non-verbal communication in dyadic interaction of different culture groups [21] and different levels of attraction between subjects in mixed-sex dyadic interaction [23].

Strong relationship has been reported between level of subject's self-esteem and number of real-time behavioral patterns produced in dyadic interaction situations [17, 18]. Using repeated measures, analyzing therapeutic interviews, Jonsson [17] reported that as self-esteem of subjects increased the amount and type of behavior emitted changed. The increasing self-esteem also resulted in different types and an increasing number of patterns being detected. But what is perhaps most interesting is the increase of the complexity of patterns detected; seemingly augmented linear with increased self-esteem.

Jonsson [18] also reported finding significant differences in real-time behavioral patterns produced in dyadic interactions between subjects who considered themselves to be friends versus those who were strangers, the level of patterning being much higher between friends. The current study reveals a clear difference in real-time patterns produced by persons with different scores on the Eysenck Personality Questionnaire; certain patterns were exclusively produced by extraverts and others by introverts. Positive correlation was also found between subject's personality and complexity and frequency of patterns.

People's self-evaluation, whether explicit or implicit, are presumably formed through interaction with significant others. Parenting style should then be regarded as an important aspect in this formation [39]. Same might apply to caregivers and teachers. The failure of external observers, in correctly identifying the level of extraversion and self-esteem of subjects, raises some questions concerning miscommunication and misinterpretations between interactants. According to Anolli [5], miscommunication does not only include its standard meaning such as a lacking, defect and violation of communication rules, but also mismatching interpretation, as well as misrepresentation of information.

The concept of self-fulfilling prophecy might also be of some importance within the framework of the current study and the formation of self-esteem/personality. It certainly seems a valid question to ask, whether a belief or expectation, correct or not, affects the outcome of a situation or the way a person will behave. Thus, for example, labeling someone a "high self-esteem individual" or an "extravert", and treating that person as such, may foster high self-esteem or extravert behavior in the person who is subjected to the expectation. Studying mismatching interpretation and

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miscommunication should thus not only consider the negative aspects but also the positive ones.

9.5 Appendix

Table 1. Verbal categories [58]

Actes à visée collaborative	Actes à visée agonale
<i>Actes de demande</i>	<i>Actes de refus d'accéder à des demandes</i>
- d'information	- d'information
- de confirmation	- de confirmation
- de validation	- de validation
- de prise de position	- de prise de position
Actes d'acceptation de satisfaire à des demandes	Actes d'acceptation de satisfaire à des demandes (actes anti-orientés)
- de confirmation	- de confirmation
- de validation	- de validation
- de prise de position	- de prise de position
Actes auto-initiés et co-orientés	Actes auto-initiés et anti-orientés
- d'information	- de confirmation
- de confirmation	- de validation
- de validation	- de prise de position
- de prise de position	- d'attaque de face

Table 2. A category system for non-verbal behavior was adopted from McGrew [59] and further developed for this study. Note that many events can be combined and like that make up a different behavior (for example look can be combined with up, down, partner or right).

<i>Metaphors</i>	Objects, Person, Attitude, Opinion, Intention
<i>Punctuators</i>	Punctuators
<i>Adaptations</i>	Face, Hands, Object, Cloths
<i>Face & head</i>	Look, Smile, Nod head, Shake head, Nod head (punctuator), Bite lips, Frown, Eye brown up, Eye closed, Eye open
<i>Direction</i>	Partner, Forward, Backward, Up, Down, Left, Right
<i>Postures</i>	Sit, Stand, Lean, Change, Lift shoulders
<i>Paralinguistic</i>	Silence, Hesitation, Cough, Laugh, "Uhum" (feedback), Interrupt
<i>Hands & fingers</i>	Hands crossed, Hands stretch, Hands rest, Hands "drum"
<i>Legs</i>	Legs crossed, Legs floor, Legs shake, Legs "tab"

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