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Master Thesis

Personality Influences in Stuttering
The influence of extraversion on type of dysfluency and communication attitude

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Abstract

Personality is assumed to be an important factor in stuttering (Guitar, 2006). The present study sets out to measure the correlation between the personality trait extraversion and two important aspects in respect to stuttering: type of dysfluency and communication attitude. This is studied in 30 people who stutter (PWS) by classifying their stutters as clonic or tonic and by measuring their degree of extraversion. To score the communication attitude of the PWS, the Erickson's Communication Attitude Scale (S-24) (Brutten and Vanryckeghem, 2003) was used. The S-24 measures the influence of stuttering on the communication attitude. Video recordings were used to score the predominant type of dysfluency. The degree of extraversion was measured by the NEO-PI-R personality questionnaire (Hoekstra, 1996), which is based on the five-factor model of personality (Fiske, 1949). No correlation was found between extraversion and the type of dysfluency. However, the communication attitude significantly correlated with extraversion. In this paper it is shown that the S-24, while measuring communication attitude, at the same time measures the degree of the personality trait extraversion on the communication attitude. This result might be of relevance in stuttering therapy development.

1   Introduction

Most people who do not stutter (PNS) take their ability to speak for granted. For people who stutter (PWS) speaking is not always a natural, effortless process. When PWS want to speak, they are aware of the possibility to get stuck in their utterance: they might stutter. Approximately 1% of all adults are chronic PWS (Bloodstein, 1995). The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; APA, 2000) describe stuttering as *"a communication disorder characterized by excessive involuntary disruptions in the smooth and rhythmic flow of speech, particularly when such disruptions consist of repetitions or prolongations of a sound or syllable, and when they are accompanied by emotions such as*

fear and anxiety, and behaviors such as avoidance and struggle." The importance of the last part of this definition should not be underestimated. The emotional, cognitive and psychosocial effects on the life of PWS are very important. Reactions of PWS and their environment on their stuttering often cause these effects. Consequently, these effects might exacerbate the speech-motor problem. It is important to stuttering research as well as to stuttering diagnosis and treatment to review all the involved factors of the stuttering problem at the same time (Stournaras, 1980).

1.1 Integral Group Therapy Erasmus MC

At the *Ear, Nose and Throat Department* of the Erasmus University Medical Center Rotterdam, the Netherlands, an integral group therapy is offered to adolescents and adults who stutter. It is called an integral therapy because of the multifactorial model the therapy is based on, developed by Stournaras (1980) (Figure 1). Each therapy/treatment group contains approximately 10 to 15 PWS. The treatment is divided into four blocks, according to the four components of Stournaras' model. Each block takes 3 months and comprises group meetings on approximately 12 whole days. During the group meetings multiple factors are treated in an integrated manner. The treatment and its efficacy are continuously monitored, as to enable improvements and track the progress in all involved domains. These evaluations are based on video recordings of the participants (to assess their speech motor behavior) and a set of questionnaires (to assess their emotions, cognitions and social interactions).
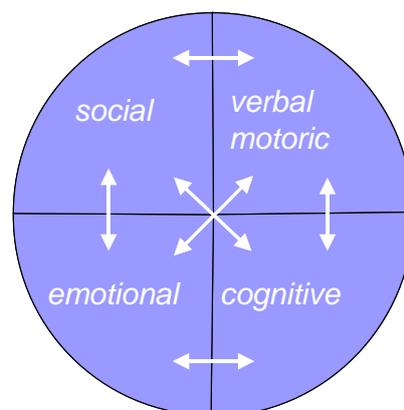

Figure 1: Erasmus four component model (Stournaras, 1980)

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2   Theoretical Background

2.1 Multifactorial Model Erasmus MC

Figure 1 shows the four component model of Stournaras (1980) which represents the interactions between four components of the stuttering syndrome: the verbal-motoric, the cognitive, the emotional and the social component. The verbal-motoric component refers to speech dysfluencies, but also to other motor activity related to speaking, such as breathing, voicing and articulation and motor activity in one or more other parts of the body e.g. hand, leg or face movements. The cognitive component refers to stuttering-related thoughts, expectations, interpretations, assumptions etc. The emotional component refers to non-specific moods of tension, specific emotions, such as fear, shame and feelings of inferiority. Finally the social component pertains to the (verbal and non verbal) interaction with the environment. The arrows refer to the mutual interactions between all components.

The following example demonstrates the interaction between these four components: A speaker stutters (verbal-motoric component), the listener avoids eye-contact (social component), the speaker thinks the listener is embarrassed by his stuttering (cognitive component), the speaker feels ashamed (emotional component) which leads to increased stuttering behavior (verbal-motoric component). Bouwen (1996) describes this interaction thoroughly and summarizes the multifactorial model as follows:

"It differentiates and combines the four components, it reflects the stuttering problem in its entirety, but at the same time offers structure in the complexity by offering an interaction structure for the four components. It also shows stuttering as a continuum, it is a symbol of the situation in which PWS can be: a vicious circle."

2.1.1 General Approach

The request from Erasmus MC was to study the role of personality traits in stuttering. Their aim is to improve their evaluation material concerning this subject. From clinical practice it is evident that personality plays an important role in therapy. In the stuttering literature personality traits are also assumed to be an important factor in stuttering (Guitar, 2006). At the same time it is not at all clear how stuttering and personality interact. It was suggested by speech pathologist Bouwen (2011) that the individual progress in therapy, at least partly, depends on personality traits of the participants. If this hypothesis is true, speech pathologists should react adequately on these different personalities in therapy.

Hence, it might be useful to include personality elements in evaluation questionnaires to complement diagnosis.

2.1.2 Evaluation Questionnaires

As said before, questionnaires are used for diagnostic purposes and to measure therapy progress. The set of questionnaires of the Erasmus MC contains the following, generally accepted, stuttering questionnaires:

1. Behavior Assessment Battery (BAB) (Brutten and Vanryckeghem, 2003): *a set of four paper and pencil tests which are designed to measure the affective, behavioral and cognitive reactions to stuttering of children and adults who stutter.*
    - S-24 Erickson's Communication Attitude Scale (S-24): *24 statements designed to be qualified with 'true' or 'false'. It measures the attitude towards different communication situations.*
    - Speech Situations Checklist – Emotional Reaction (SSC-1): *51 different speech situations designed to measure the extent to which negative emotions generally occur in these settings.*
    - Speech Situations Checklist – Impaired Speech (SSC-2): *51 different speech situations (the same as in SSC-1) designed to measure the extent to which speech disruptions generally occur in these settings.*
    - Behavior Checklist (BCL): *56 different secondary speech behaviors designed to measure the extent to which PWS display different secondary behaviors.*
2. Overall Assessment of Speakers Experience with Stuttering (OASES) (Yaruss and Quesal, 2008): *95 questions about PWS experiences with stuttering, separated in four parts:*
    - *General information*
    - *Your response to stuttering*
    - *Communication in daily situations*
    - *Quality of life*
3. Coping Inventory for Stressful Situations (CISS) (de Ridder and van Heck, 2004): *48 statements describing different ways to cope with the stuttering problem. It attempts to measure the extent to which PWS make use of these coping solutions.*

4. PBS: Personal Judgment of Own Speech (Erasmus MC, 2008): *29 statements designed to capture the personal judgment of PWS about their speaking.*

From this list of instruments, Ericson's S-24 is specifically relevant for this research, as it enables to trace personality elements.

2.1.3 The S-24 Erickson's Communication Attitude Scale

The S-24 is one of the best known research instruments in the stuttering literature. It measures the ideas and believes of PWS towards different kinds of situations where communication is needed. A negative attitude refers to more negative ideas and believes in respect to communication. Such an attitude can be a causal factor of stuttering, but it can also be the result of stuttering (Brutten and Vanryckeghem, 2003). Hence, a questionnaire that measures communication attitude might be very useful to stuttering therapy. The S-24 contains 24 true-false statements, for example: "*I find it easy to talk with almost everybody*". The total score is determined by summing the negative reactions (in case of the above example, the score "*false*" contributes to a negative attitude). Thus, higher scores refer to a negative communication attitude and lower scores indicate a positive communication attitude. The questionnaire was derived from the S-39 (Erickson, 1969), a version with 39 items, and was later modified by Andrews and Cutler (1974) to the S-24.

Brutten and Vanryckeghem (2003) revised the questionnaire. They state that PWS develop negative communication attitudes due to their experiences with stuttering and because of the reaction of the environment on their stuttering. These negative experiences lead to negative emotions and thoughts, which are often the reason for avoiding particular speech situations or particular words. The S-24 is valid and reliable and discriminates between PWS and PNS (Brutten and Vanryckeghem, 2003). According to Brutten and Vanryckeghem the S-24 is the only questionnaire, of all the present available research instruments that measures the attitude towards communication adequately (Brutten and Vanryckeghem, 2003, page 20 in Dutch version).

Other researchers also used the S-24 in stuttering research. Quesal and Shank (1978), for example, compared the communication attitudes of three different groups. The first group consisted of PWS, the second group of people with voice or articulation disorders and the third group consisted of normal speakers. The attitudes appeared to be significantly different between the three groups. The normal speakers had the most positive

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communication attitude. The group with voice and articulation disorders, was less positive and the group with PWS had the most negative communication attitude. This result suggests that stuttering causes a negative communication attitude. Therefore, improvement of this attitude might lead to improvement of the stuttering problem. Quasal and Shank (1978) state that the speech problem cannot improve until the attitude improves.

Manning (1984) was interested in the influence of age on the communication attitude of PWS. He used the S-24 to measure the communication attitude in adult PWS distributed in four age groups: 50-59 yr; 60-69 yr; 70-79 yr and 80-89 yr. Older PWS had more positive communication attitudes than younger PWS, which indicates that age influences the communication attitude.

Brutten and Vanryckeghem (2003) point out that the S-24 does not discriminate between PWS and PNS entirely correctly. In their results 12,5% of the PWS were classified as PNS and 8.4% of the PNS were classified as PWS. They explain this percentage of incorrect discrimination by differences in stuttering severity. Thus, PWS who have a mild severity of stuttering are sometimes classified as PNS. However, they cannot explain the 8.4% of PNS classified as PWS. Thus, Brutten and Vanryckeghem can explain differences in communication attitude by stuttering and stuttering severity only. Thereby they neglect the importance of individual differences in personality and the possibility that personality influences the communication attitude. Further, Brutten and Vanryckeghem (2003) cannot explain variations *within* PWS through stuttering severity only. Such variations may also be influenced by personality differences. The present research, therefore, focuses on the influence of personality traits on communication attitude (upper right arrow and bottom arrow in Figure 2).

2.2 Stuttering and Personality

Many researchers tried to clarify the interaction between personality and stuttering. Research has shown that PWS do not, on average, have other personalities than PNS (Goodstein, 1971; Woods, 1978; Yairi and Williams, 1970). This is in line with results of psychological research on personality, which states that personality is for the greater part stable and possibly genetically determined. Environment or social interaction shape personality in a very limited degree (Bouchard, 1991, 1994; Plomin and Caspi, 1999; Tellegen, 1988 – cited in Gray, 2007). This would imply that stuttering does not impact

personality significantly. Nevertheless, stuttering does influence (speech) behavior of PWS. For example, a child who stutters might be very outgoing and self-assured at first. A few years later, however, when puberty starts, he may behave more insecure and withdrawn. This transformation can be due to the mutual influences of the components of the four component model (Stournaras, 1980). However, changes in speech behavior do not necessarily lead to changes in personality of the PWS.

Stuttering cannot influence personality directly (Bouchard, 1991, 1994; Plomin and Caspi, 1999; Tellegen, 1988,– cited in Gray, 2007), but does personality influence the stuttering problem? Several authors studied the influence of different temperament and personality factors on stuttering (Bloodstein, 1995; Conture, 1991; Guitar, 2000). Sensitive children react stronger to new people and situations, which may lead to increased muscle tension and other physiological stress reactions (Kagan, 1987)(upper left arrow in Figure 2). Guitar (2006) state that "*a reactive temperament might trigger increased physical tension in a child when he or she is dysfluent and thus create a learned cycle of dysfluency begetting more severe dysfluencies, leading to chronic stuttering. On the other hand, a placid temperament in an equally dysfluent child might allow the child to stay relaxed, ignore the dysfluencies, and*
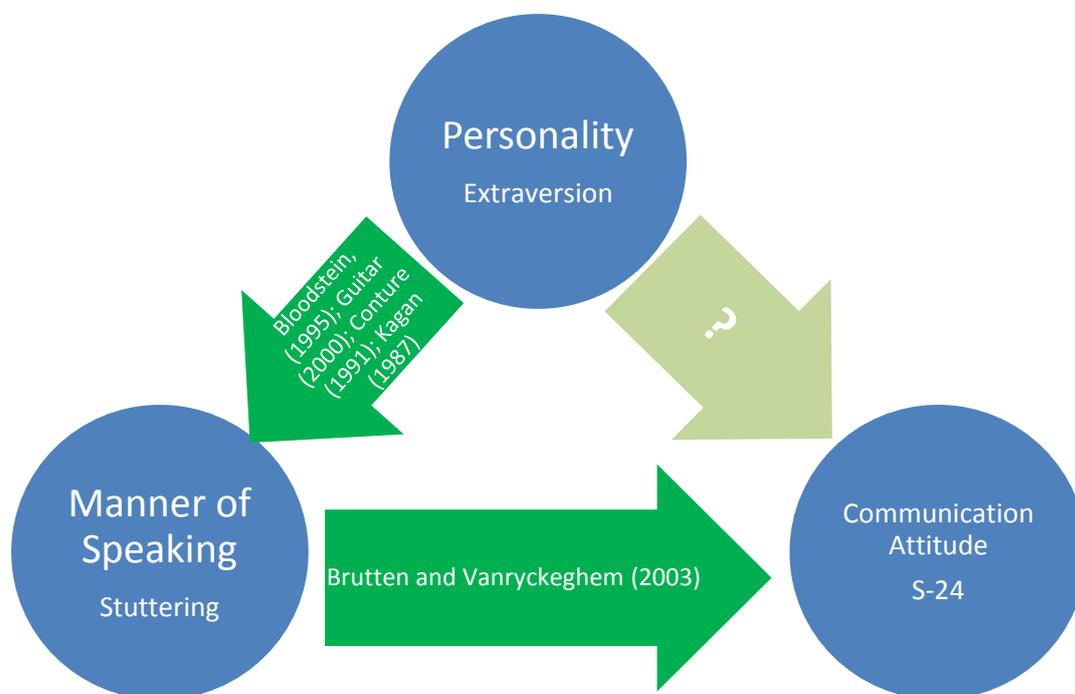

Figure 2: Representation of relations between personality, communication attitude and manner of speaking; arrow means "influences".

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thereby outgrow early stuttering". This means that temperament or personality might influence the stuttering problem in children. Hence, differences in personality might lead to differences *within* PWS, such as in their stuttering severity, in their type of dysfluency or in their emotional and cognitive reactions to stuttering.

An important personality trait in connection to stuttering is extraversion. It is one of the factors of the five-factor model (FFM) of personality which is developed by Fiske (1949). Extraversion - Introversion is a contrast based on sociability, excitability, dominance, assertiveness and emotional expressiveness. Extraverts are more assertive, active and talkative than introverts. They enjoy excitement, are positive-minded, energetic and optimistic. They are alert and focused on their environment. Introverts, on the other hand, are detached, more independent and thoughtful and they prefer being alone. They are more focused on their own feelings and thoughts than on their environment (Costa and McCrae, 1992).

Thus, an introvert person may talk less than an extravert person. Regarding stuttering, introvert PWS might stutter in a different manner than extravert PWS. Extraverts might stutter more overtly without shame or fear, while introverts may speak very thoughtful and therefore try to avoid stutters. If this is true, it is interesting to look at differences in personality traits *within* PWS or *within* stuttering subgroups. Are different personalities associated with different types of stuttering? To investigate this idea it is necessary to use a reliable and appropriate subtyping system for stuttering (behavior).

2.3 Subtype Systems

There are several stuttering subtype systems, from many different points of view. A widely used subtyping system is that of Guitar (2006), which divides stuttering into categories that each have a specific etiology. Also the distinction in developmental stages (Bloodstein, 1961) and the distribution in stuttering severity are often used in experimental studies. In the present study two subtype systems are relevant: one that divides types of dysfluencies and one that divides modes of expressions.

2.3.1 Types of Dysfluency

Froeschels (1943) was one of the first researchers who proposed a distinction on the basis of observable characteristics of dysfluencies. He used the two-type scheme that distinguishes iterative stutters (quick repetitions), defined as 'clonic' stutters and tensed

stutters (prolongations and blocks), defined as 'tonic' stutters. Clonic stutters can be described as repetitive sounds without observable tension. Tonic stutters are constricted and silent. Resulting from the distinction in kinds of stutters, PWS can be labeled as tonic or clonic PWS, depending on their predominant manner of stuttering. A remarkable feature of tonic PWS is the urge to suppress stutters, which causes tension. Clonic PWS do not suppress their stutters, which causes the audible and less tensed stutters. The underlying problem of clonic stutters is assumed to be linguistically based (a disorder in speech planning). The underlying problem of tonic stutters has been hypothesized to be physiologically based (a motor problem) (Yairi, 2007). Nevertheless, it remains unclear exactly which factors influence these different types of dysfluency.

Froeschels' typology is used in many studies on stuttering-personality associations (Diamond, 1953; Emerick, 1966; Krugman, 1946; Manning & Sheirky, 1981; Riley, 1971; Riley and Riley, 1980). A general finding is that clonic PWS are more outgoing, while tonic PWS are more sensitive and withdrawn. However, according to Van Riper (1982) these results were mostly based on deficient designs or biased interpretations. A study that was well designed and properly controlled (Emerick, 1966) did not find significant differences between the groups in different variables (responses to frustration, levels of aspiration and verbal intelligence).

Feinberg et al. (2000) set up an experiment that compared clonic PWS to tonic PWS on several psychosocial factors and intellectual functioning. In a design with 12 tonic and 18 clonic PWS significant differences were found between the two groups in verbal IQ (tonics scored higher than clonics) and in cognitive mediation. Cognitive mediation refers to *"the nature and adequacy of cognitive-perceptual resources used by an individual to deal with internal and environmental pressures."* (Feinberg, 2000). Tonic PWS scored better on this variable, which means that they deal better with internal and environmental pressure. According to Feinberg, clonic PWS deal significantly worse with the environmental pressure or do not deal with it at all. Important to the present study is that this variable, the awareness of internal and environmental pressures, is an important part of extraversion.

2.3.2 Modes of Expression

Another subtyping system relevant to the present study is one that distinguishes modes of stuttering expression, in other words: the extent to which stuttering is observable (Yairi,

2007). Douglas and Quarrington (1952) suggested that a distinction in stuttering expression could be important and they distinguished two subtypes; the exteriorized subtype and the interiorized subtype. Exteriorized PWS do not deny their stuttering and stutter overtly. Interiorized PWS are described by restrained and suppressed stuttering, shame, guilt and the denial of their stuttering. Douglas and Quarrington provided characterizations of both the exteriorized and the interiorized subtype. Kroll (1976) divided 53 adults into one of the two subgroups and compared them on 8 psychosocial and speech variables (cited in Yairi, 2007). Using a multi-discriminant analysis differences in stuttering severity, concern about stuttering and group affiliation were established.

The characterizations of this subtype system are comparable to the characterizations of the types of dysfluency. Where interiorized PWS are suppressing their stutters and avoiding speech, tonic PWS are described as restricted and silent. Where exteriorized PWS are tended to speak freely, clonic PWS speak iteratively and without tension. A plausible hypothesis, then, is that exteriorized PWS produce more clonic stutters and interiorized PWS produce more tonic stutters. It is also important to note that differences between exteriorized and interiorized PWS may be rooted in personality. Douglas and Quarrington (1952) made a useful distinction, but they did not make clear what causes these differences in behavior. It is possible that the distinction is rooted in the personality. Exteriorized PWS could then be seen as people who are born with genetic factors that make them more overt and interiorized PWS are born with a more timid personality. The distinction in modes of expression is therefore the connection between type of dysfluency (clonic/tonic speech and clonic/tonic PWS) and the personality trait extraversion. This gives rise to study these variables and measure their correlation.

3   Research Questions

The aim of the present study is to better understand the stuttering disorder and provide new insights useful to diagnosis and treatment, in particular for the participants of the group therapy at Erasmus MC. Hence, the relation between personality and stuttering is studied. As it is an important and measurable part of personality, the degree of extraversion is correlated to two variables concerning stuttering:

1. Type of dysfluency: clonic and tonic stutters/clonic and tonic PWS.
2. Communication attitude: as measured by Brutten and Vanryckeghem's S-24 (2003).

The research questions are:

1. *Is the distribution of extraversion amongst PWS different from that in the general population?*

It is expected that extraversion is evenly distributed in the participants of this study, because stuttering does not influence personality directly. So, the expectation is to find no differences with the general population in this respect.

2. *Is there a correlation between extraversion and type of dysfluency?*

It is expected that there is a positive correlation between extraversion and clonic stuttering and between introversion and tonic stuttering.

3. *Is there a correlation between extraversion and the S-24?*

It is expected that the extraversion questionnaire and the S-24 correlate with each other. A positive attitude is expected to correlate with a high score on extraversion.

4   Method

To answer research question 1 the degree of extraversion is measured in all participants. The mean extraversion score is compared to the mean degree of extraversion in the general population (normal distribution). To investigate research question 2, one group of participants is examined on two kinds of scales (1: clonic/tonic and 2: extraversion/introversion). The correlation between these two scales is determined. To answer research question 3 the results of the S-24 and the results of the extraversion questionnaire are compared for each participant and a correlation is measured.

4.1 Participants

The data files of 30 PWS are used in this study. All participants are chronical PWS and visited the ENT-department at Erasmus MC in Rotterdam for an intake interview in 2007, 2008, 2009 or 2010. Their age at time of participation of the current study (march 2011) was

between 16 and 65 years (Figure 3 and Appendix 1: Participant Information). 22 of the participants were aged younger than 30 years and 23 of all participants were male. 16 of all participants were educated at VWO, HBO or University level (Appendix 1: Participant Information). The participants contacted the Erasmus MC on their own initiative. People who were excluded from this study, based on the intake interview and judged by speech therapist and psychologist, were:

- People who appeared to suffer primarily from a psychosocial problem rather than a speech problem (as judged by a psychologist).

- People who did not speak Dutch well enough to express their feelings and thoughts (as judged by speech pathologist).

- People with a fluency disorder that appeared to be cluttering without stuttering (as judged by speech pathologist).
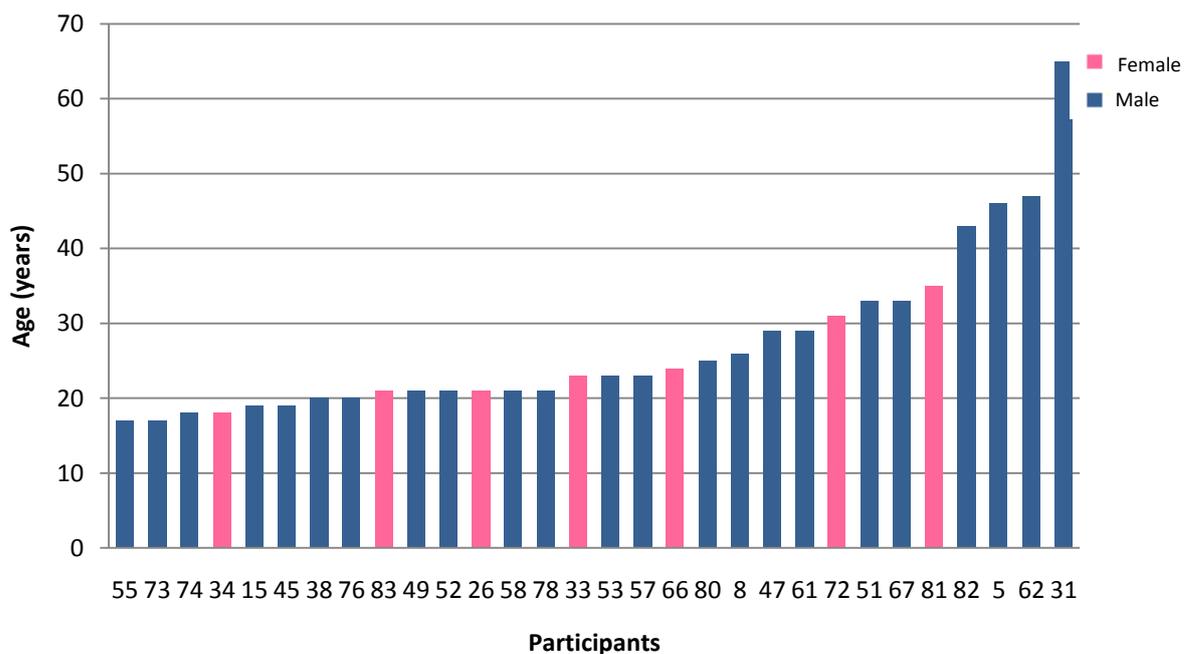
Figure 3: Age at time of participation in the study and gender of participants; numbers below bars correspond with participant number.

4.2 Equipment

To determine the degree of extraversion the participants completed a questionnaire extracted from the NEO-PI-R personality questionnaire (Hoekstra, 1996). The NEO-PI-R is based on the FFM and contains 240 statements designed to measure the extent to which the five personality factors are present. The five personality factors are covered by 48

statements each. The 48 statements concerning to extraversion were put together for the current study. An example is: "*I prefer doing things alone*". The Dutch translation of the Revised NEO Personality Inventory (Costa and McCrae, 1992) is used, which is standardized for the general population. High scores on the extraversion questionnaire refer to extravert people and lower scores refer to introvert people.

To score the kinds of stutters of the participants video recordings were used. The video recordings were made with a Canon MV3i MC Digital video Camcorder.

To compare the scores of the communication attitude to extraversion the S-24 Erickson's Communication Attitude Scale was used (see: 2.1.3 The S-24 Erickson's Communication Attitude Scale), which is part of the Behavior Assessment Battery (BAB) (Brutten and Vanryckeghem, 2003).

4.3 Procedure

During the intake interview at the Erasmus MC the PWS were asked to complete two speaking tasks:

-   A semi-spontaneous conversation. The interviewer asked questions within the subject holiday. The exact questions were not determined in advance. The participants were told that the conversation would be recorded. The conversation took about 5 minutes, depending on the amount of stutters and the mean duration of the stutters (when there were a lot of long stutter moments, the conversations took longer). The conversation contained approximately 400 words (spoken by the PWS).

-   Reading out loud a neutral, not manipulated, written Dutch text of approximately 200 words.

Both speech tasks were recorded while the participants were sitting in a quiet room with only the interviewer present. The video camera was in front of the participant at a distance of approximately 3 meter.

During the intake interview, the PWS filled in the set of evaluation questionnaires of Erasmus MC including the S-24 (see: 2.1.2 Evaluation Questionnaires). Specifically for the current study, all participants who visited the Erasmus MC for the intake interview in the last 4 years were asked to fill in the extraversion questionnaire. This was sent to the participants' home address, at different moments during their treatment, depending on which year they

had started in the program. Because of the fact that this questionnaire concerned personality, it is assumed it did not matter when exactly the participants filled in the questionnaire. 38% of the participants filled in the extraversion questionnaire and sent it back to Erasmus MC. Obviously, only the people who sent back the extraversion questionnaire took part in the present study.

4.3.1 Scoring

Stuttering was transcribed and classified before the scoring of the personality questionnaire, so that the observer was blind to the participants personality profiles. Next to that, two extra observers scored a part of the data. Observer 1 scored the data files of all participants, observer 2 and 3 both scored three participants. Six randomly chosen participants were randomly divided over observer 2 and 3. Six values were measured for each participant (proportion of stutters, proportion of clonic/tonic stutters, proportion of avoiding each both for semi-spontaneous speech and for reading out loud separately). Thus, every observer scored three participants on six values, amounting to eighteen values measured per observer (Appendix 2: Interobserver Reliability). An inter observer reliability was measured by correlating the eighteen values of observer 1 and 2 and of observer 1 and 3. These values were measured on text level. The correlation with both observers was significant (1 and 2: p = 0,000 with α = 0,01, correlation coefficient = 0,871; 1 and 3: p = 0.005 with α = 0,01, correlation coefficient = 0,553). It has to be taken into account that this correlation coefficient would have been more reliable when more participants would have been scored. Due to limited time, it was not possible to score more participants in the current study. Hence, the correlation coefficient only gives an indication of the reliability of the scoring system.

To score the stutters and to classify them as either clonic or tonic, a score sheet was made (Appendix 3: Score Sheet - Instructions) based on the classification of Janssen (1985). In Table 1 the variables and formulas are given which are used to calculate the fraction of clonic and tonic stuttering for each PWS. Next to the objective scoring, a short general description of the PWS was made by the same observer, concerning speaking rate, secondary behaviors, presence of expletives, respiration, posture, duration of stutters and the difference between the spontaneous speech task and the reading speech task.

Variable	Formula
Rate of tonic stutters (*T*)	$T = TS / (TS + CS)$
Rate of clonic stutters (*C*)	$C = CS / (TS + CS) = 1-T$
Rate of stuttering avoidance (*A*)	$A = R + RU + E) / W$

Table 1: Scoring formula's. Meaning of abbreviations: TS: number of tonic stutters; CS: number of clonic stutters; R: number of revisions; RU: number of run-ups; E: number of expletives; W: number of words.

Revisions, run-ups and expletives are actually normal dysfluencies, but these speech disruptions are often used to avoid stutters. The amount of these dysfluencies, in the speech samples of the participants, gives an indication for the degree of avoidance of stuttering. It is important to score the moments where participants avoid stutters, because avoiding is a feature of interiorized stuttering (see: 2.3.2 Modes of Expression).

5   Results

5.1 Research Question 1: Extraversion amongst PWS and PNS.

In the present study the mean extraversion score was 156,4 with a standard deviation of 24,7. The mean extraversion score of the general population is 152 with a standard deviation of 19 (Hoekstra, 2003). A t-test shows that the means of these two groups do not differ significantly (p = 0,35, two sided). Thus, the sample of the current study and the general population do not differ significantly, which means that PWS and PNS are equal in this respect. In the general population younger people have higher extraversion scores than older people, this is also the case in the present study (Table 2). Because of the small sample size it is not useful to investigate this values more specifically.

	Sample present study			Standards NEO-PI-R		
Age	**N**	**Mean**	**Sd**	**N**	**Mean**	**Sd**
< 30	23	158	26,8	141	161	19
30 - 49	6	153,7	19,8	294	153	19
≥50	1	140	-	237	146	16
All	30	156,4	24,7	672	152	19

Table 2: Extraversion values for participants present study (left column) and general population (right column) (Hoekstra, 2003). For each group the number of participants, the mean value and the standard deviation is given per age group.

5.2 Research Question 2: Correlation between extraversion and type of dysfluency.

28 participants (93%) were predominantly tonic PWS, rather than clonic PWS. Only two participants had more clonic stutters than tonic stutters in their speech. Figure 4 shows the percentage of tonic (T) and clonic (C) stutters for each participant. The mean T for all participants was 81%. Thus the mean C (= 1 – T) was 19%. The standard deviation, corresponding to this mean, was 19%. Mark that the distribution is highly unsymmetrical as the result is bounded between 0 and 1.
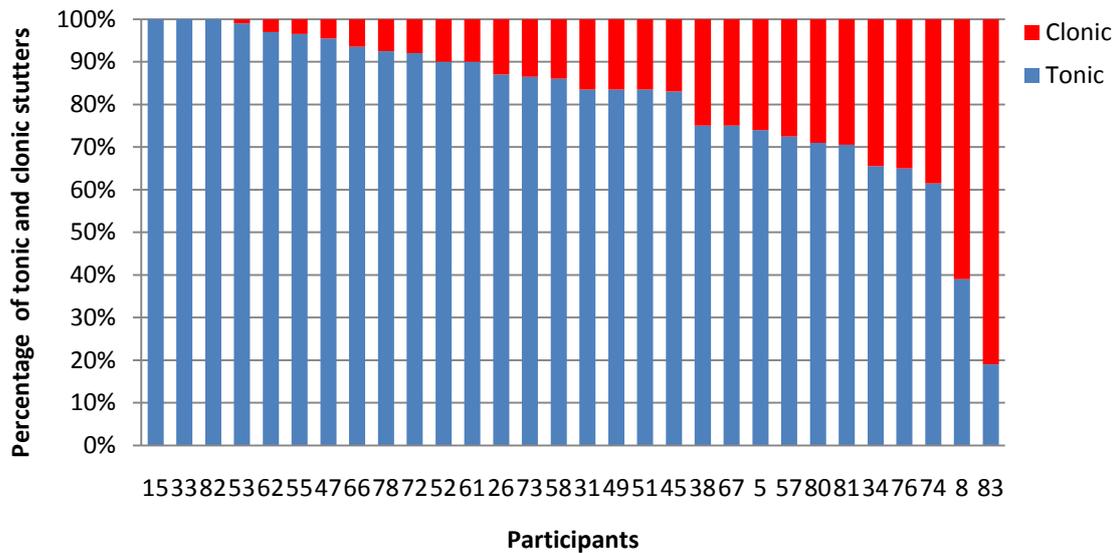
Figure 4: Fraction of tonic and clonic stutters for each participant. Numbers below bars correspond with participant number.

The percentage of tonic stutters was correlated to the extraversion score. No correlation was found between type of dysfluency and extraversion, though. Pearson's product moment correlation coefficient shows a correlation coefficient of -0,075 (p = 0,695). In the scatter plot in Figure 5 the scores of both scales are projected for each participant.
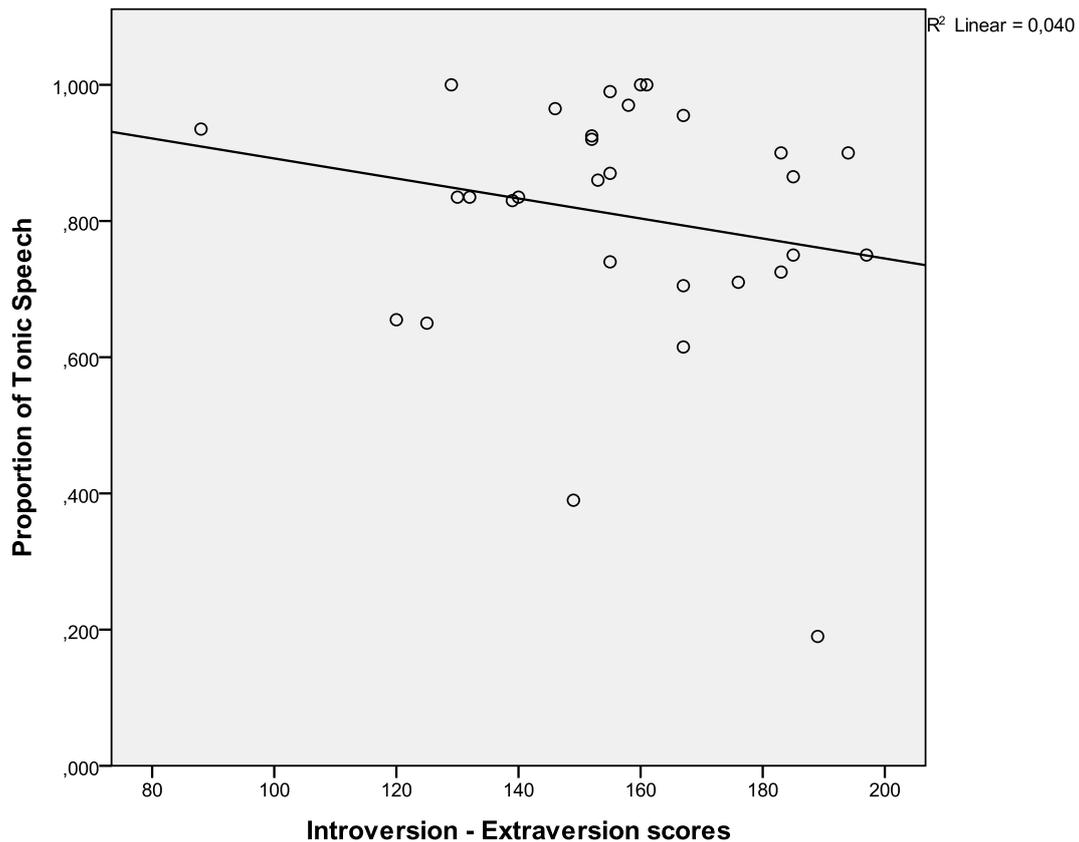
Figure 5: Distribution of extraversion versus the degree of tonic speech, for each participant. A low score on the extraversion variable refers to introversion, a high score refers to extraversion.

## 5.3 Research Question 3: Correlation between extraversion and the S-24.

The mean S-24 score of the participants of the current study was 15,57, with a standard deviation of 4,39. The general population of PWS scores 16,15, with a standard deviation of 4,76 (Brutten and Vanryckeghem, 2003) (Table 3). A t-test shows that the means of these two groups do not differ significantly (p = 0,48, two sided). Thus, the sample of the current study and the general population of PWS do not differ significantly, which means that the present sample can be considered equal to PWS in general, in this respect.

A significant correlation (p = 0,019 with α = 0,05, correlation coefficient = -0,44) was found between the S-24 communication attitude and extraversion. In other words, participants with a high score at the extraversion questionnaire (extraverts) had a low score on the S-24 (positive communication attitude). Figure 6 shows the interaction between extraversion and the communication attitude.
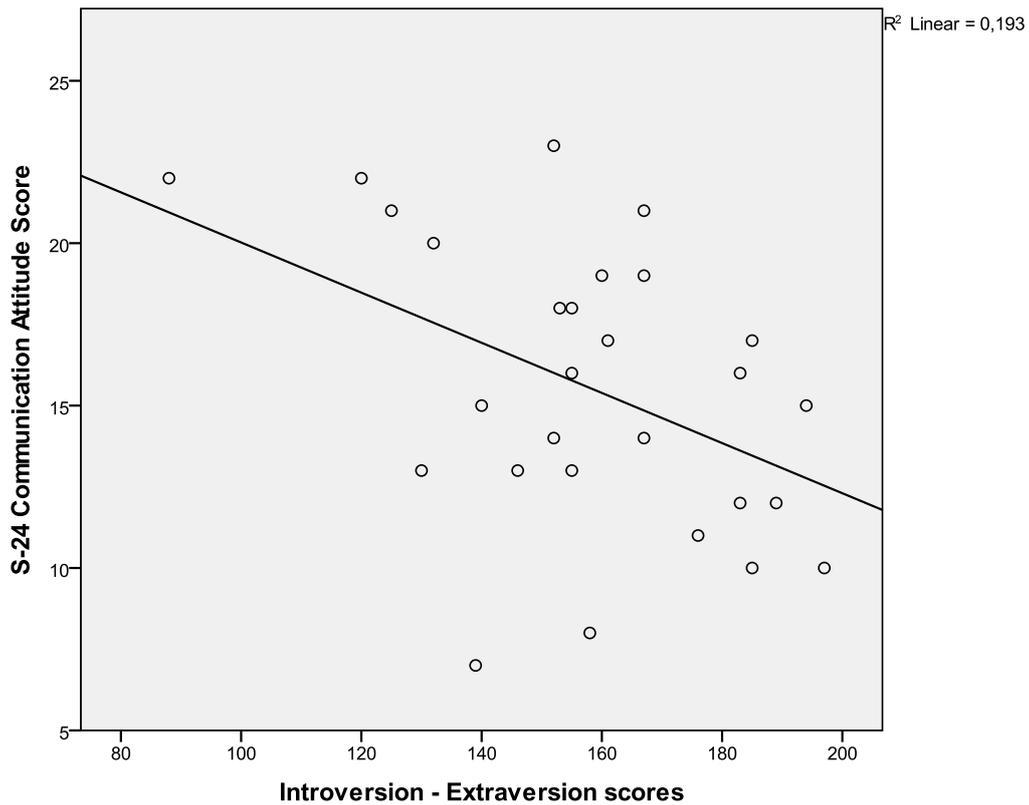
Figure 6: Distribution of extraversion scores and communication attitude for each participant. A low score on the extraversion variable refers to introversion, a high score refers to extraversion. A low score on the S-24 variable refers to a positive communication attitude, a high score refers to a negative communication attitude.

Gender	Sample present study			Standards S-24 (stuttering adults)	
	N	Mean	Sd	Mean	Sd
Men	23	14,76	4,28	15.84	4,91
Women	7	18	4,08	17.38	4,17
All	30	15.57	4,39	16.15	4,76

Table 3: S-24 scores for participants of present study (left column) and PWS in general (right column) (Brutten and Vanryckeghem, 2003). For each group the mean value and standard deviation is given per gender group.

6   Discussion

This study attempted to correlate extraversion to predominant type of dysfluency and to communication attitude in PWS. The mean extraversion score of the participants of this study was equal to that of the general population, as was hypothesized. This means that there are no specific differences between PWS and PNS, according to the personality trait extraversion.

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It was hypothesized that there is a positive correlation between extraversion and clonic stuttering and between introversion and tonic stuttering. The outcomes of the study suggest there is no correlation between type of dysfluency and extraversion in PWS, though.

However, the predominant dysfluency type of the majority of the participants was classified as tonic, rather than clonic, which means the groups were unequal. It remains unclear why there were more tonic PWS than clonic PWS in this participants group.

It was hypothesized that there is a correlation between extraversion and communication attitude. The results confirm this expectation. Extraversion correlates with a positive communication attitude and introversion correlates with a negative communication attitude. From this it can be concluded that the personality trait extraversion influences the communication attitude in PWS. The stuttering problem and stuttering severity are therefore not the only factors that influence this attitude. It remains uncertain if personality is a causal factor of the communication attitude.

In Figure 7 the relation between personality (more specifically, degree of extraversion), manner of speaking (more specific: stuttering) and communication attitude (measured by S-24) is represented. Personality influences the manner of speaking and the communication attitude. Stuttering influences the communication attitude as well.
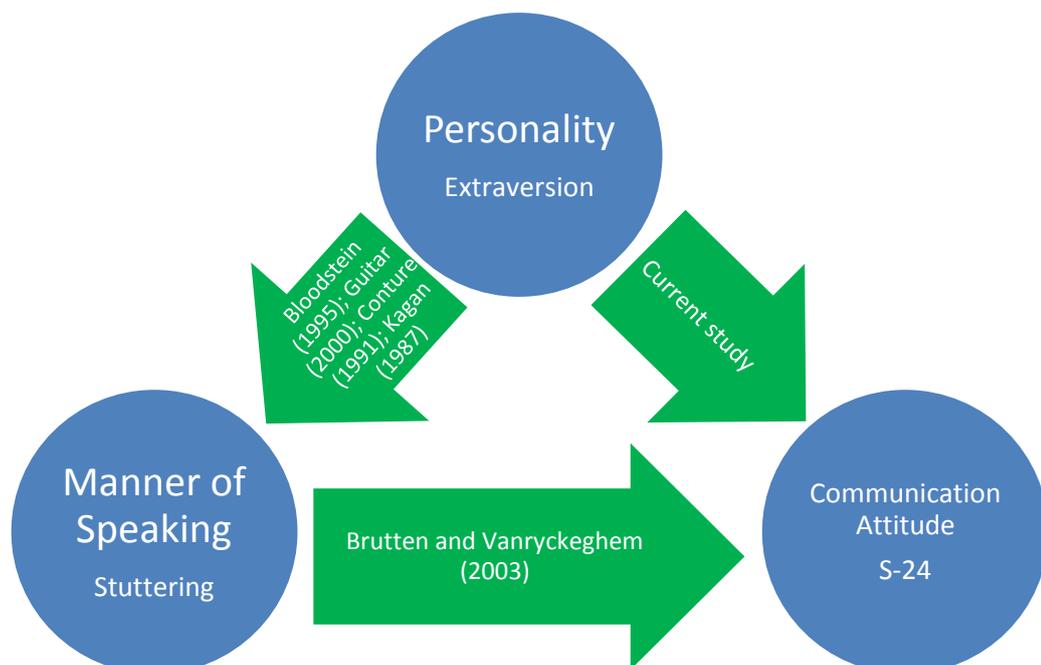

Figure 7: Representation of relation between personality, communication attitude and manner of speaking; arrow means "influences".

6.1 Interpretations and Recommendations

6.1.1 Extraversion in PWS and PNS

There appeared to be no difference between PWS and PNS in extraversion scores, which is in accordance with the literature discussed in paragraph 2.2 Stuttering and Personality. Stuttering does not influence extraversion significantly, or in general, manner of speaking does not influence personality significantly.

6.1.2 Extraversion and Type of Dysfluency

It was assumed by Yairi (2007) that the underlying problem of clonic stutters is linguistically based (a disorder in speech planning) and the underlying problem of tonic stutters is physiologically based (a motorial problem) (see: 2.3.1 Types of Dysfluency). Since in the current study the type of dysfluency and extraversion did not correlate, different types of dysfluency were not shown to be psychologically based instead of linguistically and physiologically based. Hence, Yairi's hypothesis could not be rejected.

However, there are several methodological factors that could have influenced the result concerning the relation between extraversion and type of dysfluency, such as the scoring system, the sample size and the diversity within the participants regarding the type of dysfluency. These factors influence the interpretations of the results.

The scoring of the kinds of stutters may have caused a less reliable result. It appeared to be very difficult to develop an objective scoring system. A part of the data was scored by two observers and this resulted in a lot of differences between the classifications of the stutters on word level. Individual observers sometimes score one and the same stutter in a different way. This might indicate that there is not always a strict distinction between tonic and clonic stutters. If this is the case, this would complicate the identification of a connection between these different types of dysfluencies and personality factors. This possibility deserves further research. However, for the current study these differences in classifications on word level were of less importance than the correlations on text level. As there indeed was a correlation in type of dysfluency between the observers on text level, the observers did agree on the predominant type of dysfluency of the participants. This was a sufficient condition for the current study.

Further, there seem to be more than just two meaningful differences between stutters, concerning the relation with personality. The distinction between silent blocks and heared

blocks, which in the present study were both classified as tonic, could be of great use in studies like this. Thus, the classification system of Froeschels (1943), with only two subgroups, appeared to be too rough and is not capable of handling subtle differences between stutters.

A more reliable and valid system, which distinguishes stutters sharply, is needed. Follow-up studies should make clear if it is possible to develop such a reliable scoring system concerning type of dysfluency. An option to make the system more reliable is to measure tenseness in the body, for example by blood pressure measures. This will give objective results, which can help to make reliable subgroups. In Toronto a scientific study in stuttering (led by Pascal van Lieshout) focused on the development of recording equipment specified to transcribe stutters automatically. This may lead to a very consistent way of scoring stutters, but minor differences could probably not be detected with equipment like that.

The high rate of tonic PWS means that the participants of this study have more tensed stutters than stutters without tension. From literature it is not clear how this variable is distributed in PWS in general. In the study by Feinberg (2000) 18 clonic PWS and 12 tonic PWS participated. He does not, however, explain how he recruited them and how he divided them into one of the two classes. If we assume that there exist as many clonic PWS as there are tonic PWS in the general population of PWS, it should be explained why the participants of this study scored more tonic than average. It is possible that it is due to the mean age of the participants. 66% of the participants is between 15 and 26 years old (adolescents). Young children who stutter, often suffer less from negative emotions and cognitions and their stutters are less tensed (Guitar, 2006, page 167). In puberty, when environmental pressures (peer pressure for example) increase, emotions and thoughts often become more negative (Steinberg, 2002). As people grow older they focus more on the present and the positive, suffer less from negative emotions and are less sensitive to their environment (Carstensen, 1992; Fung, 1999). Future research should make clear whether age differences lead to significant differences within PWS, in respect to their type of dysfluency. A longitudinal or cross sectional research would be convenient then.

The unequal groups in type of dysfluency in the present study led to an unreliable result, concerning the correlation with extraversion. In the near future it should be very interesting to compare tonic and clonic subgroups again, but with equal and larger groups, in combination with a reliable scoring system.

6.1.3 Extraversion and Communication Attitude

The correlation between extraversion and communication attitude is a contribution to fundamental stuttering research. The interpretation of the S-24 is now more complete. Brutten and Vanryckeghem (2003) explained different communication attitudes in PWS by stuttering problem factors. The outcomes of the current study are an addition to the informative value of the S-24. It was shown that extraversion influences the communication attitude. This may alter the interpretations of individual results of the S-24.

The outcomes of this part of the study may also lead to different interpretations of the S-24 in clinical practice. The results enables speech pathologists to adjust their responses to the results of S-24 in PWS. When S-24 scores are high, therapy might also focus on coping strategies in relation to the personalities of PWS. It has to be taken into account that personality cannot be changed easily, but PWS can learn to cope with their own personality and have insight in the effect of different personalities on stuttering. A better understanding of their own actions, emotions and thoughts, might lead to improved acceptation of their situation.

It might be interesting to compare PWS to PNS in future research. If PNS also show a correlation between extraversion and communication attitude, this would consolidate the outcomes of the current research. However, the mean communication attitude of PWS will probably be more negative than that of PNS, because of the influence of stuttering on communication. Nevertheless, a comparable correlation pattern is expected in PNS, further research should determine if this expectation is correct.

The outcomes of the present research give reason to study the correlation between personality and other stuttering questionnaires, used for diagnose and treatment evaluation. To diagnose correctly, speech therapists often use a sequence of questionnaires which PWS have to complete at different times during therapy. This costs a lot of time and energy, which may be superfluous. Further research should make this clear. The CISS would be an interesting questionnaire to study in this respect. The relation between coping strategies and personality could be exposed. If it is possible to shorten the amount of questionnaires to a smaller, more basically oriented, questionnaire, this would be a step forward for diagnosis.

A last recommendation is to involve more personality traits in stuttering research, besides extraversion. Correlating other personality traits to stuttering aspects could give a more

complete representation of the influence of personality in stuttering. A logical continuation to the present research would be to overlook the other four dimensions of the FFM: neuroticism, openness to experience, agreeableness and conscientiousness.

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Appendix 1: Participant Information

Participant number	Gender (men (M)/women (W))	Age (years; months)[1]	Education level[2]
5	M	46;11	HBO
8	M	26;11	Unknown
15	M	19;0	MAVO
26	M	21;4	VMBO
31	M	65;3	LTS
33	M	23;0	HBO
34	W	18;3	VMBO
38	M	20;1	MBO
45	M	19;10	VMBO
47	M	29;0	University
49	M	21;11	MBO
51	M	33;10	Unknown
52	W	21;2	MBO
53	M	23;1	University
55	M	17;1	VWO
57	W	23;11	HBO
58	M	21;4	MBO
61	W	29;3	University
62	M	47;1	University
66	M	24;11	MBO
67	W	33;6	MAVO
72	M	31;9	HBO
73	M	17;3	VWO
74	M	18;2	University
76	W	20;7	University
78	W	21;7	VWO
80	M	25;2	HBO
81	M	35;11	University
82	M	43;2	University
83	M	21;1	HBO

Table 1: Participant information.

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[1] Age at time of participation of current study. The data files were made 1 to 4 years earlier, depending on date of intake interview.

[2] According to the Dutch education levels and their abbreviations.

Appendix 2: Interobserver Reliability

Variables (proportions)	Observer 1	Observer 2
Participant 1		
Spontaneous - Stuttering	0,13	0,112
Spontaneous - Clonic stutters	0,07	0
Spontaneous - Avoiding	0,004	0,004
Reading - Stuttering	0,07	0,056
Reading - Clonic stutters	0,08	0,2
Reading - Avoiding	0	0
Participant 2		
Spontaneous - Stuttering	0,057	0,049
Spontaneous - Clonic stutters	0,52	0,25
Spontaneous - Avoiding	0,002	0
Reading - Stuttering	0,052	0,043
Reading - Clonic stutters	0,18	0,22
Reading - Avoiding	0	0
Participant 3		
Spontaneous - Stuttering	0,064	0,086
Spontaneous - Clonic stutters	0,27	0,31
Spontaneous - Avoiding	0,02	0,03
Reading - Stuttering	0,014	0,019
Reading - Clonic stutters	0	0,5
Reading - Avoiding	0	0

Table 1: Scores of observer 1 and 2 of three randomly selected participants. All scores refer to the proportion of a particular variable, which is always a number between 0 and 1.

Variables (proportions)	Observer 1	Observer 3
Participant 4		
Spontaneous - Stuttering	0,08	0,09
Spontaneous - Clonic stutters	0,59	0,67
Spontaneous - Avoiding	0,003	0,09
Reading - Stuttering	0,01	0
Reading - Clonic stutters	0	0
Reading - Avoiding	0	0
Participant 5		
Spontaneous - Stuttering	0,133	0,165
Spontaneous - Clonic stutters	0,33	0,25
Spontaneous - Avoiding	0,003	0,003
Reading - Stuttering	0,118	0,101
Reading - Clonic stutters	0	0
Reading - Avoiding	0	0
Participant 6		
Spontaneous - Stuttering	0,032	0,037
Spontaneous - Clonic stutters	0,36	0,47
Spontaneous - Avoiding	0,005	0,009
Reading - Stuttering	0,287	0,376
Reading - Clonic stutters	0,86	0,1
Reading - Avoiding	0	0,023

Tabel 2: Scores of observer 1 and 3 of three randomly selected participants (three others than in table 1). All scores refer to the proportion of that particular variable, which is always a number between 0 and 1.

Appendix 3: Score Sheet - Instructions

Instructie:
Noteer voor elk woord of dit woord vloeiend uitgesproken wordt of dat er sprake is van een clonische of een tonische stotter. Doe dit door de kleur van het woord aan te passen volgens onderstaande legenda. Bij twijfel tussen twee notaties, wordt gekozen voor de meest overheersende stotter in dat woord. Bij het hoorbaar vermijden van een stotter wordt een '/' genoteerd op die plek.

Tonische stotter = verlenging en blokkade (spanning zichtbaar).
Clonische stotter = snelle herhaling van een klank of lettergreep.
Vermijding = revisies, aanloopjes en stopwoordjes.
Onverstaanbaar woord = xxx

Tonische stotter: t
Clonische stotter: c
Vermijding: /

Algemene indruk
Geef een korte omschrijving van opvallendheden binnen onderstaande punten:
-Spreektempo en –volume
- Secundaire gedragingen
- Aanwezigheid stopwoordjes
- Ademhaling
- Houding
- Duur van de stotters
- Eventueel verschil benoemen spontaan en lezen

Scoren:
Bereken deze waarden apart voor het semi-spontane gesprek en voor de leestekst:

Totaal aantal woorden: W
Totaal aantal clonische stotters: CS
Totaal aantal tonische stotters: TS
Totaal aantal vermijdingen: VS
Percentage clonic: C
Percentage tonic: T
Percentage vermijding: V

Instruction:
Note for every spoken word if it is fluent or if it is a clonic or tonic stutter. You can do this by coloring the word according to the instructions below. When you doubt a notation, chose the most dominant kind of stutter in that word. When you hear an avoidance of a stutter. You notice a '/' at that spot.

Tonic stutter = prolongation and blocks (tension is visible).
Clonic stutter = quick repetition of a sound or syllable.
Avoiding = revisions, run-ups and expletives.
Unintelligible word = xxx

Tonic stutter: t
Clonic stutter: c
Avoiding: /

General impression:
Give a short description of remarkabilities of below points:
-Speaking rate –volume
-Secondary behaviors
-Presence of expletives
-Respiration
-Posture
-Duration of stutters
-Possible: difference between spontaneous speech and reading

Scoring:
Calculate the values of semi-spontaneous speech and reading speech separately:

Total amount of words: W
Total amount of clonic stutters: CS
Total amount of tonic stutters: TS
Total amount of avoidings: VS
Percentage clonic: C
Percentage tonic: T
Percentage avoiding: V

Formules:

Voor de berekening van het totale percentage kernstotter-niet-vloeiendheden (KS) gebruiken we de volgende formule:

(TS + CS) /W = KS

Voor de berekening van het percentage tonische en clonische stotters gebruiken we de volgende formule:

TS / (TS + CS) = T
1 - T = C

Om een inschatting te kunnen maken van de mate van vermijdingsgedrag gebruiken we de volgende formule:

VS / W = V

Formula's:

To calculate the total percentage of core stutter dysfluencies (KS) we use the following formula:

(TS + CS)/ W = KS

To calculate the percentage of tonic and clonic stutters we use the following formula:

TS / TS + CS) = T
1 - T = C

To estimate the degree of avoiding of stuttering we use the following formula:

VS /W = V

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