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Impact of stuttering severity on adolescents' domain-specific and general self-esteem through cognitive and emotional mediating processes

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# **Impact of stuttering severity on adolescents' domain-specific and general self-esteem through cognitive and emotional mediating processes**

## **Abstract**

### ***Purpose***

The theory that self-esteem is substantially constructed based on social interactions implies that having a stutter could have a negative impact on self-esteem. Specifically, self-esteem during adolescence, a period of life characterized by increased self-consciousness, could be at risk. In addition to studying mean differences between stuttering and non-stuttering adolescents, this article concentrates on the influence of stuttering severity on domain-specific and general self-esteem. Subsequently, we investigate if covert processes on negative communication attitudes, experienced stigma, non-disclosure of stuttering, and (mal)adaptive perfectionism mediate the relationship between stuttering severity and self-esteem.

### ***Methods***

Our sample comprised 55 stuttering and 76 non-stuttering adolescents. They were asked to fill in a battery of questionnaires, consisting of: Subjective Screening of Stuttering, Self-Perception Profile for Adolescents, Erickson S-24, Multidimensional Perfectionism Scale, and the Stigmatization and Disclosure in Adolescents Who Stutter Scale.

### ***Results***

SEM (Structural Equation Modeling) analyses showed that stuttering severity negatively influences adolescents' evaluations of social acceptance, school competence, the competence to experience a close friendship, and global self-esteem. Maladaptive perfectionism and especially negative communication attitudes fully mediate the negative

influence of stuttering severity on self-esteem. Group comparison showed that the mediation model applies to both stuttering and non-stuttering adolescents.

### ***Conclusion***

We acknowledge the impact of having a stutter on those domains of the self in which social interactions and communication matter most. We then accentuate that negative attitudes about communication situations and excessive worries about saying things in ways they perceive as wrong are important processes to consider with regard to the self-esteem of adolescents who stutter. Moreover, we provide evidence that these covert processes also need to be addressed when helping adolescents who are insecure about their fluency in general.

## 1. Introduction

Few studies have explored the relationship between cognitive and emotional processes linked to stuttering and self-esteem of adolescents who stutter (AWS). Adolescence is a turbulent emotional time, during which self-esteem can suffer due to a variety of reasons. During adolescence, both physical and cognitive maturation take place. These developments are associated with psychological and social changes (e.g. increased social comparisons, egocentric and abstract thinking; (Slot & van Aken, 2013). As a consequence, this period of life is characterized by increased self-consciousness. Adolescents try to diminish the attention on qualities they perceive to be negative (Santrock, 2011). With this in mind, AWS are likely to consider their stuttering a negative aspect that should be hidden.

In addition to involuntary speech disruptions, the concept of stuttering includes more covert social, cognitive and affective dimensions that must be considered. Different definitions of stuttering refer to specific emotions such as fear, anxiety, embarrassment and irritation (American Psychiatric Association, 2012; Wingate, 2001; Yaruss & Quesal, 2004). Furthermore, studies have demonstrated that people who stutter (PWS) often show cognitive distortions such as perfectionistic thinking and report negative speech-related attitudes and difficulties in communicating with others, leading to avoidance behavior to hide from possible negative reactions (Amster & Klein, 2004; Boey, 2008). These cognitive and emotional processes related to stuttering complicate career choices and social life, and affect the quality of life of PWS (Boey, 2008; Shapiro, 2011; Tran, Blumgart, & Craig, 2011).

Taking into account the physical and emotional changes of adolescence and the

additional stress due to stuttering, it can be expected that AWS have an increased risk of low self-esteem. The current study takes a closer look at the association between stuttering severity, and domain-specific and global self-esteem in adolescents. We then study the mediating role of covert processes related to stuttering, that is communication attitudes, perfectionistic thinking, perceived stigma and non-disclosure practices of stuttering, thereby unraveling the mechanisms of more hidden stuttering behavior.

### *1.1. Stuttering and Self-esteem*

Someone's self-esteem is his or her answer to the question 'How much do I value, like and accept myself', a 'looking-glass self' through which experiences are perceived. As explained by Yeung and Martin (2003), it is the result of a social process through which we learn to see ourselves through the eyes of others. In particular, significant others' opinions are critical for developing a person's self-esteem. In other words, self-esteem is substantially developed through social interactions and feedback, next to other non-communication related sources (McCroskey, Richmond, Daly, & Falcione, 1977; Schacter, Gilbert, & Wegner, 2009).

What if someone's communication experiences have been unrewarding due to stuttering? Negative communication experiences may result in lower self-esteem and doubts about the ability to enact the role of a competent communicator (Pearson, Child, DeGreeff, Semlak, & Burnett, 2011). Janssen (1985) stated that thoughts about stuttering occupy a central place in the cognitive system of PWS, allowing their stuttering to determine their self-esteem to a large extent. Different studies of adults who stutter report adverse effects of stuttering on self-esteem (e.g. Bajina, 1995; Klompas & Ross, 2004). Studying children

who stutter, Yovetich, Leschied, and Flicht (2000), however, found no evidence of low self-esteem as compared to normative data. They concluded that stuttering is not the main factor that determines the self-esteem of children who stutter, and referred to the 'lack-of-experience' hypothesis; children who stutter probably do not have enough exposure to verbal experiences for their self-esteem to be affected. Moreover, children who stutter, unlike adults, probably have not yet developed a self-image of 'stuttering', in a way that implies compulsive deviancy (Green, 1998). As a result, their concerns about their stuttering are not yet reflected in their self-esteem. Consequently, Yovetich et al. (2000) wondered how long children that stutter could discount the importance of verbal communication in order to maintain their self-esteem. Zückner (2011) observed that self-esteem of children and adolescents who stutter continuously declines with age (based on a study with children aged 8 to 15 years). Nevertheless, in the studies of Blood, Blood, Tellis, and Gabel (2003) and Blood, Blood, Maloney, Meyer, and Qualls (2007), the majority of participating AWS (secondary school-age) reported a normal to positive self-esteem, comparable with their non-stuttering peers. Whereas the latter studies only evaluated global self-esteem, Zückner (2011) studied multiple domains of self-esteem.

Scientists agree on a domain-specific approach of self-esteem, in addition to a sense of global self-esteem (Harter, 1983). Children already differentiate between different aspects of competence (cognitive, physical) and adequacy (appearance, conduct, social acceptance). From the age of eight these discrete evaluations are combined to form a more global sense of self-esteem (Harter, 1983). Moreover, personality theorists have long underlined the importance of considering domains of functioning with particular developmental relevance. For example, social acceptance and behaving in conformity with

their peers seem to be of extra importance in adolescence (King, Naylor, Segal, Evans, & Shain, 1993). Yovetich et al. (2000) included a domain-specific measure studying the self-esteem of children who stutter, that is the Culture Free Self-Esteem Inventory (Battle, 1992). Their study showed different outcomes for domain-specific and global self-esteem. The current study takes into account domain-specific and global self-esteem of AWS.

### *1.2. Cognitive and emotional processes related to stuttering and self-esteem*

Because of the difficulty of covering all aspects of this multifaceted speech disorder, the metaphor of the ‘iceberg of stuttering’ is often used (Sheehan, 1970). This metaphor emphasizes covert processes, such as cognitions and emotions related to stuttering and *“must be considered in connection with symptomatology, since they often constitute a major part of the problem of stuttering”* (Bloodstein & Ratner, 2008, p. 23). We will investigate in more detail negative communication attitudes, experienced stigma, non-disclosure of stuttering, and (mal)adaptive perfectionism, processes that are frequently studied or considered relevant in relation to stuttering and self-esteem.

#### *1.2.1. Negative communication attitudes*

Several studies have demonstrated that PWS report more negative attitudes towards communication, than a non-stuttering control group (Andrews & Cutler, 1974; Boutsen & Brutten, 1989; Brutten & Vanryckeghem, 2003; De Nil & Brutten, 1991; Vanryckeghem & Brutten, 2011). Telephone and group conversations and formal presentations are less enjoyed by PWS (Watson, 1988). Vanryckeghem, Brutten and Hernandez (2005) found that children at the age of three can already be aware of their disfluent speech. Age has a significant effect on communication attitudes. Moreover, negative communication attitudes

of children who stutter increase with age, whereas for their non-stuttering peers these negative attitudes decrease with age (Vanryckeghem & Brutten, 1997). Also, negative communication attitudes increase with stuttering severity (Miller & Watson, 1992).

Fear about speaking to people has a disrupting effect on social interactions, thereby discouraging the development of communication skills and communication competence (Blood, Blood, Tellis, & Gabel, 2001; Richmond & McCroskey, 1998). What is more, severe stuttering could elicit anxiety and avoidance in both speakers and listeners (Collins & Blood, 1990), making social interactions even more challenging. Weisel and Spektor (1998) found a correlation between attitudes toward communication and social self-image, a construct closely related to domain-specific social self-esteem.

### *1.2.2. Maladaptive and adaptive perfectionism*

Perfectionism has often been mentioned in the stuttering literature as a possible personality characteristic related to stuttering (Amster, 1995; Riley & Riley, 2000; Stumpf & Parker, 2000). Vuylsteke, Reunes and Van Borsel (2001) referred to it as 'the Demosthenes-complex'. Demosthenes (fourth century BC) desperately tried to improve his disfluent speech by putting pebbles in his mouth. Perfectionist individuals have unrealistic personal standards, look at the world with cognitive distortion and are very self-critical. Perfectionism is seen as a multidimensional construct, comprising adaptive (associated with positive strivings and setting higher personal standards) and maladaptive (associated with fear of negative consequences, such as making mistakes) perfectionism (Frost, Heimberg, Holt, Mattia, & Neubauer, 1993).

Brocklehurst, Drake and Corley (2015), taking into account multidimensional perfectionism, found higher self-ratings of speaking disfluency to be associated with



increased concerns over mistakes and lower personal standards. Amster and Klein (2007) concluded that PWS are often less tolerant of errors in their speech, and therefore might be more concerned about saying things in ways they perceive as wrong and more intense in their reactions towards disfluency. The same authors suggested that when someone is overly concerned about making speech errors or being disfluent, this results in increased feelings of distress, struggle and fear and will consequently make their stuttering more persistent. Accordingly, perfectionism is associated with low self-esteem, anxiety and depression (Burns, 1980; Kawamura, Hunt, Frost, & DiBartolo, 2001). Especially maladaptive perfectionism is associated with low self-esteem (Ashby & Rice, 2002; Stumpf & Parker, 2000), while adaptive perfectionism has been often positively correlated with more constructive outcomes, such as feelings of efficacy and positive self-esteem (Frost, Marten, Lahart, & Rosenblate, 1990).

### *1.2.3. Experienced stigma and non-disclosure of stuttering*

Different authors consider stuttering as a stigmatizing condition, accompanied by feelings of shame and self-consciousness and the belief that stuttering limited their life opportunities (Boyle, Blood, & Blood, 2009). A study of Blood et al. (2003) showed, however, that the majority of their adolescents did not perceive their stuttering to be stigmatizing; their stuttering did not affect whether people wanted to be friends with them, whether people liked them, or whether they were asked on dates or to parties. Erickson and Block (2013) reported comparable results. Approximately 20 to 25 percent of the participants in both studies did feel sometimes or often stigmatized. Blood et al. (2011) concluded that students who stutter experienced more bullying than students who did not stutter. This 'stuttering stigma', as labeled by Boyle et al. (2009), is often the result of negative listeners

reactions. Various groups, including students, speech therapists and teachers, see PWS as nervous, quiet, avoiding, passive and tense (Boey, 2008). The media often presents a negative and stereotypical image of stuttering (Benecken, 1996). As a consequence these negative beliefs are also seen in PWS, indicating that these stereotypes are internalized among PWS (Boyle, 2013). In other words, people tend to modify their 'looking-glass self' so that it matches the perceptions of others (McCroskey et al., 1977). Subsequently, it should not be a surprise that feeling stigmatized has been associated with lower self-esteem (Schmitt, Branscombe, Postmes, & Garcia, 2014).

According to Crocker, Major, and Steele (1998) visibility is an important dimension in understanding individuals who are stigmatized. Therefore it is not surprisingly that PWS who feel stigmatized often try to hide their stuttering (Acton & Hird, 2004; Craig, Hancock, Tran, & Craig, 2000). This non-disclosure of stuttering is often reported in literature on the development of chronic stuttering as a coping behavior to hide from negative reactions. (Blomgren, 2013; Bloodstein & Ratner, 2008; Plexico, Manning & Levitt, 2009). Hiding stuttering because of fear of negative responses increases negative feelings such as distress, anxiety and tension, which in turn increase the chance of stuttering. The studies of Blood et al. (2003) and Erickson and Block (2013) both indicated that the majority of their participants rarely or never spoke about their stuttering. No study reported on non-disclosure practices in stuttering in correlation to self-esteem. However, a study examining people with a mental illness (Ilic et al., 2012), revealed that secrecy or being careful about when and to whom to reveal their condition is associated with lower self-esteem.

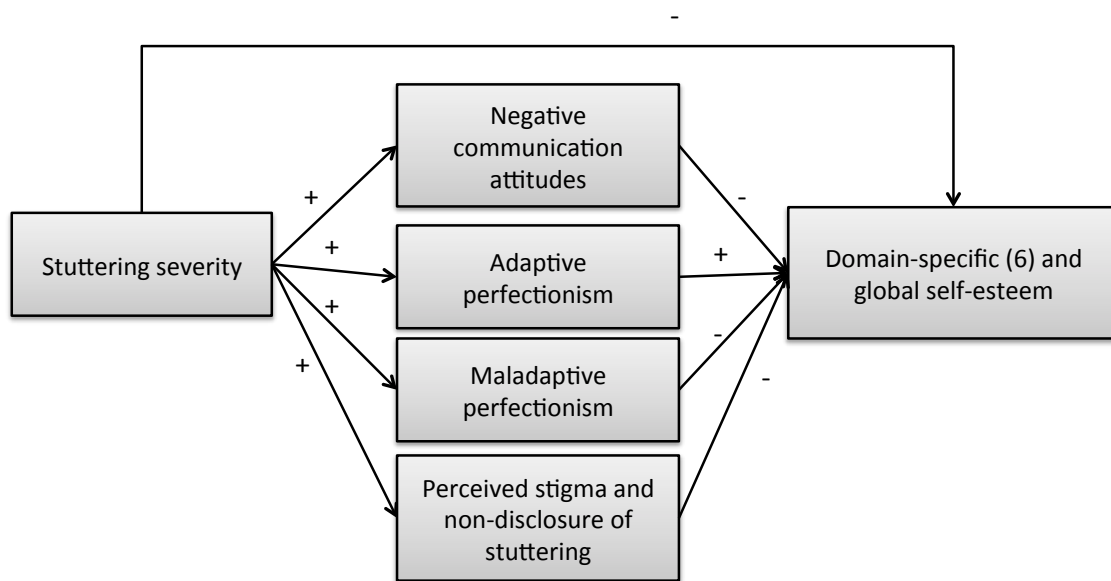
### *1.3. Research questions*

Considering the equivocal results in previous studies, the first focus of the study is the relationship between stuttering and self-esteem in adolescence. In line with Harter (1983), we included domain-specific self-esteem, that is social acceptance, school competence, athletic competence, physical appearance, conduct behavior and the ability to maintain close friendships, next to global self-esteem. This way we anticipated the possibility that the impact of stuttering differs depending of the domain of self-esteem. To date, no studies with AWS have been conducted that take into account domain-specific self-esteem.

What is also not considered in the previously mentioned studies is the possible influence of stuttering severity on self-esteem. Stuttering severity is an important variable. For example, people who stutter more severely have a higher risk of poor emotional functioning (Craig, Blumgart, & Tran, 2009) and poorer quality of life (Koedoot, Bouwmans, Franken, & Stolk, 2011). Most studies on self-esteem have focused on mean differences between a group of people who do and do not stutter, whereas no attention has been paid to the relevance of the degree of stuttering severity in predicting the risk of lower self-esteem. In other words, do AWS who stutter more severely have a higher risk of low self-esteem, as compared to their less severe stuttering peers? The current study embedded the two approaches.

As stated by Hayes and Scharkow (2013), it is important to study whether a variable affects another variable, but it is better to go further by identifying also the mechanisms by which that effect operates. Therefore, we investigated the possible mediation role of covert processes related to stuttering in the relationship between stuttering severity and self-esteem, in particular negative communication attitudes, maladaptive and adaptive perfectionism, and experienced stigma and non-disclosure of stuttering. Despite the implied

importance of these emotions and cognitions for the stuttering process, social adjustment and self-esteem, these different processes have not yet been studied to explain the relationship between stuttering (severity) and self-esteem. Moreover, including the different processes as mediators in one model made it possible to determine the relative magnitude of each of the processes. Figure 1 gives an overview of the hypothetical model.



**Fig. 1:** Hypothetical model

## 2. Method

### 2.1. Participants

Our participants who stutter were recruited by various speech and language therapists and rehabilitation centers working with PWS in Flanders (Belgium). The sample of adolescents who stutter (AWS) comprised 55 participants diagnosed as stutterers by a speech therapist, who were 35 boys (63,6%) and 20 girls (36,4%). 88.7% of the AWS had already received therapy for reducing or altering stuttering behavior. Additionally, a school for secondary education was contacted to obtain the control group for the study (students of approximately 12 – 18 years old). Through oral advertising and social media, adolescents

of 19-20 years old were invited. 76 adolescents without a diagnosis of stuttering participated (non-stuttering adolescents or NSA), of which 55 were boys (72,4%) and 21 girls (27,6%).

Next to gender, the two groups of participants did not differ in terms of other demographic variables, that is age ( $t(128) = 1,67, ns$ ) and socio-economic status ( $\chi^2(3) = 4.38, ns$ ). The age of the total sample ranged between 11 years 11 months and 21 years 11 months ( $M = 16$  years 5 months,  $SD = 3$  years). In terms of SES, based on the diploma and occupation of the parents, the majority of the adolescents in the study were situated in middle class (41,2%) or lower middle class (32,8%) (Hollingshead Index of social position; Hollingshead, 1957).

The participants could fill in the battery of questionnaires through e-mail or on paper. There was no reward attached to participation. All participants were informed of the reason for the study.

## 2.2. Questionnaires

### 2.2.1. Independent variable: stuttering severity

Stuttering severity was measured using the Subjective Screening of Stuttering instrument (SSS), which contains 22 items (Riley, Riley, & Maguire, 2004). It is a self-report measure, estimating stuttering severity as perceived by the participant him or herself. The items measuring the level of locus of control ( $N = 9$ ) were not used in this study, because of content overlap with one of the mediators, in particular communication attitudes. Sample items are “How would you score your speech with an authority figure during the last week” and “How often did you change words during the last week when you thought you might get stuck on the telephone”. The internal consistency of the shortened version of 13 items for this study was  $\alpha = .91$ . Stuttering severity as measured with the SSS correlated moderately ( $n$

= 33;  $r = .38$ ;  $p < .05$ ) with an assessment of stuttering severity by a speech therapist (Stuttering Severity Instrument; Riley, 1994). Items were scored on a nine-point Likert scale. Higher scores correspond with higher self-stuttering severity.

### 2.2.2. *Dependent variable: Self-esteem.*

To measure self-esteem we used the Dutch translation (Treffers et al., 2002) of the Self Perception Profile for Adolescents (SPPA, Harter, 1988). The SPPA consists of 35 items, which measure six domains of self-esteem and a global sense of self-esteem: social acceptance (“I am easily liked”), school competence (“I doubt that I am as smart as my peers”), athletic competence (“I think I am not good at sports”), physical appearance (“I am satisfied with how I look”), behavioural conduct (“I often do things knowing that I'm not following the rules”), close friendship (“I can keep a friendship for a long time”), and global self-esteem (“I am often disappointed in myself”). Treffers et al. (2002) reported average to good reliability scores of the subscales. Similarly, the Cronbach's alphas in our study were  $\alpha > .71$ . Items were presented to the participants in a five-point Likert scale ranging from “totally not true” to “totally true” and were reverse scored if required. A higher score corresponds to a more positive perceived self-esteem.

### 2.2.3. *Mediators*

#### 2.2.3.1. *Communication attitudes*

The measure used is the Erickson S-24 (Andrews & Cutler, 1974), a questionnaire composed of 24 items that measures attitudes towards speaking and communication in adolescents and adults. Sample items are “I find it easy to talk with almost anyone” and “A person who is my teacher or my boss is hard to talk to”. The S-24 showed content validity, comparing stuttering and non-stuttering samples (Andrews & Cutler, 1974). The scale

showed adequate internal consistency in this study ( $\alpha = .92$ ). We used a five-point Likert scale ranging from “totally not true” to “totally true”. Items were reverse scored if required. A higher score corresponds to more negative communication attitudes.

#### *2.2.3.2. Perfectionism*

The questionnaire used to measure perfectionistic thinking was the Multidimensional Perfectionism Scale (Frost et al., 1990). The MPS assesses 5 dimensions of perfectionism: excessive concern over making mistakes, high personal standards, perception of high parental expectations and criticism, doubting the quality of one’s own actions, and a preference for order and organization. The MPS is a reliable and valid measure of perfectionism (Frost et al., 1990; 1993). For the current study we did not use the complete instrument. In accordance with Soenens, Nevelsteen, and Vandereycken (2007) we merged the subscales ‘concern over mistakes’ (“If I fail at work/school, I am a failure as a person”) and ‘doubting of actions’ (“It takes me a long time to do it right”) to measure maladaptive perfectionism. The maladaptive perfectionism scale consisted of 13 items with a Cronbach’s alpha of .88 in our study. Adaptive perfectionism was studied using the subscale ‘personal standards’ (“I set higher goals for myself than most people”), which consisted of seven items. The Cronbach’s alpha was .76. Items were presented to the participants in a five-point Likert scale ranging from “totally not true” to “totally true”. A higher score represents more adaptive/maladaptive perfectionistic thinking.

#### *2.2.3.3. Experienced stigma and non-disclosure of stuttering*

Studying stigmatization and non-disclosure practices of AWS, Blood et al. (2003) adapted a set of questions measuring experienced stigma in people with epilepsy, drawn up by Westbrook, Bauman, and Shinnar (1992). More specifically, the word 'epilepsy' in the questions was replaced by 'stuttering'. Erickson and Block (2013) referred to the scale as the Stigmatization and Disclosure in Adolescents Who Stutter Scale. It measures to what extent the participants perceive a 'stuttering stigma' (3 items) and want to hide their stuttering (4 items). Sample items are "Do you think that your stuttering affects whether people want to be friends with you" (perceived stigma) and "When you can, do you keep your stuttering a secret from others" (non-disclosure of stuttering). The questions presented to the control group in this study were slightly adapted. For example: "If you would stutter, would you keep your stuttering a secret from others when you can". Both scales showed to be valid and reliable measures in the studies of Westbrook et al. (1992) and Blood et al. (2003). Internal consistency in this study was  $\alpha = .87$  for perceived stigma and  $\alpha = .56$  for the non-disclosure subscale. The items were scored on a 4-point scale, ranging from "never" to "always". A higher score corresponded with a higher feeling of stigmatization and non-disclosure of stuttering.

### *2.3. Statistical procedure*

Few cases had missing values on demographic variables and some of the study variables. Little's (1988) MCAR-test turned out to be non-significant (normed  $\chi^2 = 1.44$ ), indicating that drop-out likely occurred at random. Hence, the missing data were dealt with through the Expectation Maximization (EM; Schafer, 1997) algorithm. As a consequence, for all further analyses  $N = 131$  (AWS = 55 and NSA = 76).



Preliminary analyses explored possible effects of demographic variables on the different variables of the hypothetical model (see Figure 1). Therefore, a multivariate analysis of covariance (MANCOVA) was executed with the different variables of the model as dependent variables and gender, age and SES of the parents as independent variables (while controlling for group, i.e. AWS and NSA). If proven significant related to the variables of the model, background variables were included as control variables in the following analyses.

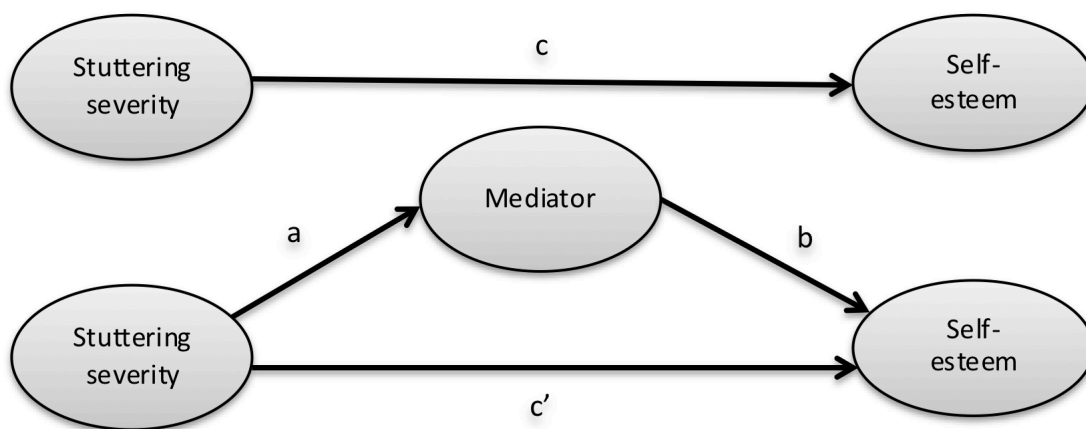
Primary data analyses proceeded in three steps. First, we conducted a one-way between groups MANCOVA to assess mean differences between AWS and their non-stuttering peers (independent variable) for the different study variables (dependent variables), while controlling for significant background variables (covariates).

Second, path analyses were conducted to study the influence of stuttering severity on self-esteem. We started with structural equation modeling (Mplus 6; Muthén & Muthén, 1998-2010) on the total sample of  $N = 131$ , with stuttering severity as independent variable and domain-specific and global self-esteem as dependent variables (taking into account significant control variables). Subsequently, multigroup path analyses showed us whether associations between stuttering severity and self-esteem are similar or different between AWS and NSA. We compared a model in which the path coefficients were allowed to vary between both groups and a constrained model where the path coefficients were set equal across the two groups (Bollen, 1989). The hypothesis of invariance was rejected if the difference in the  $\chi^2$  index of both models was significant at  $p < .05$ . Only those domains of self-esteem significantly influenced by stuttering severity were retained in the third step.

Finally, to examine the hypothetical model with multiple mediators and to examine whether group moderates this mediation model, we again performed path analysis followed

by multigroup comparison using structural equation modeling (Bollen, 1989). Initially, we tested the model with the effect of stuttering severity on self-esteem mediated by negative communication attitudes, experienced stigma, non-disclosure of stuttering, and maladaptive and adaptive perfectionism in the total sample of  $N = 131$  (again controlling for background variables). To maintain sufficient power considering the smaller sample sizes, only significant paths (i.e. mediators and control variables) were retained in the following tests, comparing the mediation model for the stuttering and non-stuttering groups (see supra).

The mediation analyses were firstly performed separately per domain-specific and global self-esteem. Considering possible significant covariances between different domains of self-esteem, a synthesis model was then tested containing the different domains of self-esteem significantly influenced by stuttering severity.



**Fig. 2:** The mediation design

Figure 2 illustrates the mediation design, with the corresponding codes of the different effects. The relationship of stuttering severity on self-esteem is referred to as the *total effect* of stuttering severity on (domain-specific and global) self-esteem (path c). This needs to be distinguished from path  $c'$ , referring to the *direct effect* of stuttering severity on

self-esteem, controlling for the mediator(s). The codes a and b refer respectively to the relationship between stuttering severity and the mediator and to the direct effect of the mediator on self-esteem. To estimate significance of indirect effects, a bootstrapped method was used with 5000 bootstraps and 95% confidence interval. Bootstrapping is a non-parametric re-sampling procedure, in which a process of sampling with replacement is repeated 5000 times. By estimating the indirect effect in each resampled data set, an empirical approximation of the sampling distribution of path ab is built and used to construct confidence intervals for the indirect effect. A bootstrapped method makes no assumptions about sampling distributions of direct or indirect effects (Preacher & Hayes, 2008).

To examine model fit we inspected the Normed Chi-square ( $\chi^2/df$ ), the Standardized Root Mean Square Residual (SRMR), the Root Mean Squared Error of Approximation (RMSEA), and the Comparative Fit Index (CFI). Combined cut-off values of .08 for SRMR and .06 for RMSEA indicate a good model fit. For the CFI, values greater than .95 indicate good fit. Finally,  $\chi^2/df$  values lower than 3 indicate good fit (Hu & Bentler, 1999; Kline, 2011).

### **3. Results**

#### *3.1. Preliminary analyses*

Preliminary analyses studying the impact of gender, age, and SES (while controlling for group), showed significant multivariate effects (using Wilks's Lambda) of gender ( $F(13,114) = 4.50, p < .001, \eta^2 = .34$ ) and age ( $F(13,114) = 2.38, p < .01, \eta^2 = .21$ ) on the combined variables. No significant effect was found for SES ( $F(13,114) = .61, ns$ ). Subsequent univariate analyses indicated that girls reported higher levels of stuttering severity ( $F(1,126) = 13.05, p < .001, \eta^2 = .09$ ) and negative communication attitudes ( $F(1,126) = 8.69, p < .01, \eta^2 = .06$ ).

= .07), and lower levels of athletic ( $F(1,126) = 17.84, p < .001, \eta^2 = .12$ ), physical ( $F(1,126) = 8.70, p < .01, \eta^2 = .07$ ), and global self-esteem ( $F(1,126) = 17.45, p < .001, \eta^2 = .12$ ). Similarly, older adolescents scored higher on negative communication attitudes ( $F(1,126) = 5.64, p < .05, \eta^2 = .04$ ), maladaptive perfectionism ( $F(1,126) = 9.93, p < .01, \eta^2 = .07$ ) and perceived stigma ( $F(1,126) = 7.44, p < .01, \eta^2 = .06$ ), compared to younger adolescents. We controlled for gender and age in further analyses.

**Table 1.**

Differences in Means between AWS and NSA

		$F$ (1,127)	$\eta^2$	AWS (N=55)		NSA (N=76)	
				$M$	$SD$	$M$	$SD$
<i>Independent variable</i>	Stuttering severity	72.76***	.36	3.10	0.12	1.70	0.11
<i>Dependent variables</i>	Social acceptance	2.82		3.60	0.08	3.78	0.07
	School competence	0.18		3.57	0.08	3.52	0.07
	Athletic competence	1.88		3.48	0.10	3.30	0.09
	Physical appearance	1.09		3.71	0.10	3.57	0.08
	Behavioural conduct	0.03		3.38	0.08	3.36	0.07
	Close friendship	2.46		4.26	0.07	4.40	0.06
	Global self-esteem	1.38		3.74	0.09	3.88	0.07
<i>Mediators</i>	Negative communication attitudes	31.11***	.20	2.93	0.07	2.40	0.06
	Maladaptive perfectionism	0.32		2.25	0.07	2.20	0.07
	Adaptive perfectionism	0.23		2.78	0.08	2.83	0.07
	Perceived stigma	29.42***	.19	1.90	0.10	2.60	0.08
	Non-disclosure of stuttering	0.49		2.19	0.08	2.12	0.07

Note. AWS = adolescents who stutter; NSA = non stuttering adolescents; \* $p < .05$  \*\* $p < .01$ . \*\*\* $p < .001$ .

### 3.3. Primary analyses

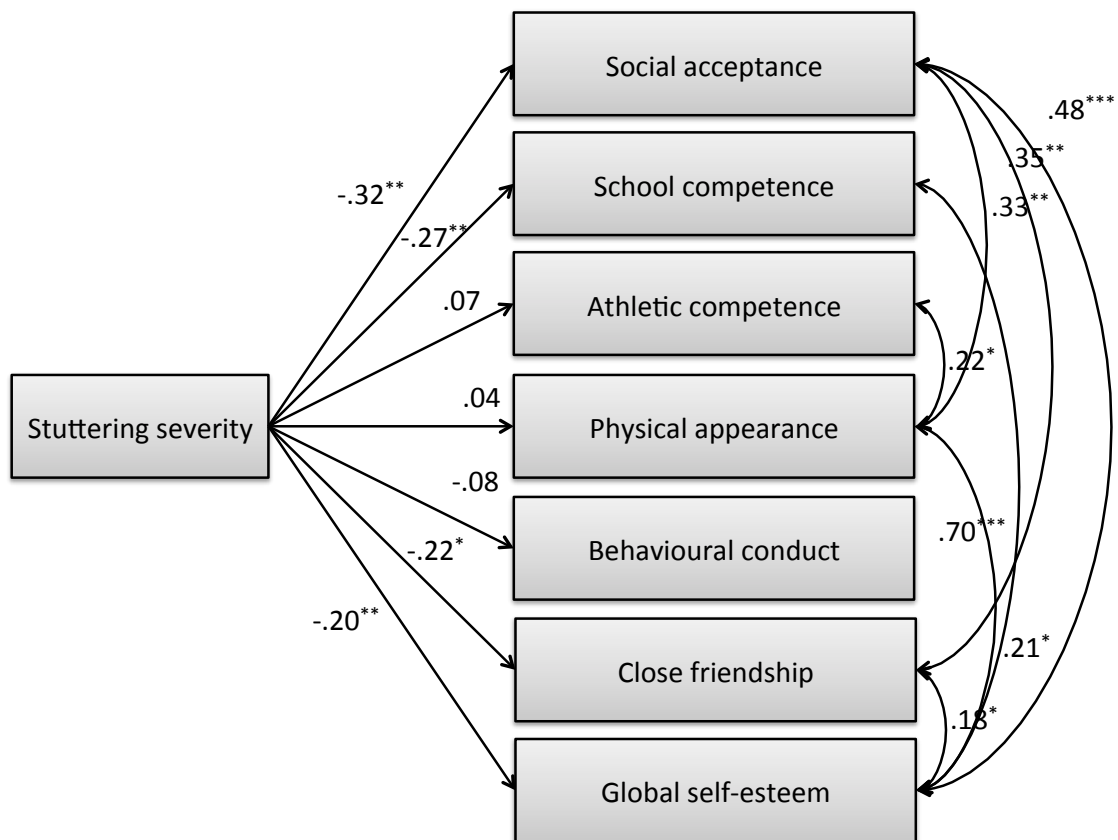
#### 3.3.1. Mean Differences between stuttering and non-stuttering adolescents

Multivariate analysis of variance yielded significant differences (using Wilk's Lambda) between the two groups on the variables of the hypothetical model ( $F(13,115) = 12.74, p < .001, \eta^2 = .59$ ). When the results for the different variables were considered separately, we found that AWS reported on average higher scores on stuttering severity and negative communication attitudes, and lower scores on perceived stigma, compared to adolescents not diagnosed as stutterers (see Table 1).

#### 3.3.2. Stuttering severity and self-esteem

Path analyses were performed to study the influence of stuttering severity on domain-specific and global self-esteem. An unconstrained model with stuttering severity as independent variable, and the six specific domains of self-esteem and global self-esteem as dependent variables was tested on the total sample of  $N = 131$ . Covariances between dependent variables were taken into account. The model (see Figure 3) had good fit to the data ( $\chi^2/df=1.46, RMSEA=.06, SRMR=.04, CFI=.98$ ). Specifically, significant path coefficients were found between stuttering severity on the one hand and social acceptance, school competence, close friendship and global self-esteem on the other hand.

Subsequently, multigroup comparison of the model showed that all paths could be considered equal between AWS and NSA ( $\Delta\chi^2(7) = 9.14, ns$ ), indicating that the model represented in Figure 3 applied to both stuttering and non-stuttering adolescents. Self-reported stuttering severity explained 10.1% of variance in social acceptance, 7.2% in school competence, 5.0% in close friendship competence and 15.8% in global self-esteem.



**Fig. 3.** Path-analytic model. Influence of stuttering severity on self-esteem. Standardized coefficients are presented. For clarity, non-significant covariances between domains of self-esteem, and paths from the control variables are not shown, but were included in the analysis. \* $p < .05$  \*\* $p < .01$ . \*\*\* $p < .001$

### 3.3.3. Multiple mediator model

Finally, mediation analyses were performed. Negative communication attitudes, maladaptive and adaptive perfectionism, perceived stigma, and non-disclosure of stuttering were taken into account as possible explanatory factors in the relationship between stuttering severity and self-esteem (i.e. social acceptance, school competence, close friendship and global self-esteem).

### 3.3.3.1. Explaining the relationship between stuttering severity and social acceptance

Results for social acceptance ( $N = 131$ ) showed that the total indirect effect through the mediators was significant (see Table 2). As a set, negative communication attitudes, adaptive and maladaptive perfectionism, and perceived stigma and non-disclosure of stuttering mediated the effect of stuttering severity on social acceptance. Furthermore, the direct path of stuttering severity (c.f. Fig. 2, p. 17) was no longer significant when mediators were taken into account ( $c'$  path:  $b = .07$ ,  $SE = .05$ ,  $\beta = .13$ ,  $ns$ ). In other words, complete mediation occurred.

**Table 2**

Mediation of the effect of stuttering severity on social acceptance, through negative communication attitudes, adaptive and maladaptive perfectionism, and perceived stigma and non-disclosure of stuttering. Standardized estimates are reported.

	<i>a</i>	<i>b</i>	<i>ab</i>	Percentile bootstrap 95% CI	
				Lower	Upper
<i>Neg communication attitudes</i>	.64***	-.64***	-.40***	-.58	-.23
Maladaptive perfectionism	.37***	-.19	-.07	-.16	.02
Adaptive perfectionism	.15	-.05	-.01	-.05	.03
Perceived stigma	-.04	-.05	.00	-.02	.02
Non-disclosure of stuttering	.19*	.11	.02	-.02	.06
<b>TOTAL</b>			<b>-.46***</b>	<b>-.62</b>	<b>-.29</b>

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

The results of the indirect effects indicated that only negative communication attitudes acted as mediator. The directions of the a path and b path were consistent with the interpretation that increased stuttering severity led to more negative communication

attitudes, which in turn led to a more negative estimation of social acceptance. Although stuttering severity significantly predicted maladaptive perfectionism and approached significant prediction of non-disclosure of stuttering, these processes were not significantly related to social acceptance. Moreover, stuttering severity did not significantly predict adaptive perfectionism and perceived stigma of stuttering, which in turn were also not significantly related to social acceptance. As would be expected from these results, adaptive and maladaptive perfectionism, perceived stigma, and non-disclosure of stuttering did not contribute to the indirect effect beyond negative communication attitudes (ab paths).

Multigroup comparison of the parsimonious model that contained the mediation of stuttering severity on social acceptance via negative communication attitudes, suggested that the a path and b path were similar between AWS and NSA ( $\Delta\chi^2(2) = 0.12, ns$ ). This model, applicable for adolescents who do and do not stutter, fit the data well ( $\chi^2/df = 1.23$ , RMSEA = .04, SRMR = .03, CFI = .99) and explained 34,4% of variance in social acceptance.

### 3.3.3.2. *Explaining the relationship between stuttering severity and school competence*

Mediation analyses for *school competence* on the total sample also resulted in a significant total indirect effect through the set of mediators (see Table 3). Again, complete mediation occurred (c' path:  $b = .05, SE = .06, \beta = .10, ns$ ).

The results of the indirect effects indicated that negative communication attitudes and maladaptive perfectionism acted as mediator. Higher perceived stuttering severity is related to more negative communication attitudes and more maladaptive perfectionism, which in turn led to a more negative estimation of school competence. Adaptive perfectionism, perceived stigma and non-disclosure of stuttering did not act as mediator.



This was partly because of no significant relationship to school competence, as in the case of perceived stigma and non-disclosure of stuttering. More adaptive perfectionism however significantly led to higher scores on school competences, but was not significantly related to stuttering severity (see supra).

**Table 3**

Mediation of the effect of stuttering severity on school competence, through negative communication attitudes, adaptive and maladaptive perfectionism, and perceived stigma and non-disclosure of stuttering. Standardized estimates are reported.

	<i>a</i>	<i>b</i>	<i>ab</i>	Percentile bootstrap 95% CI	
				Lower	Upper
<i>Neg communication attitudes</i>	.64 <sup>***</sup>	-.28 <sup>*</sup>	-.18 <sup>*</sup>	-.34	-.02
<i>Maladaptive perfectionism</i>	.37 <sup>***</sup>	-.50 <sup>***</sup>	-.19 <sup>**</sup>	-.30	-.07
Adaptive perfectionism	.15	.24 <sup>**</sup>	.04	-.03	.11
Perceived stigma	-.04	-.05	.00	-.02	.02
Non-disclosure of stuttering	.19 <sup>*</sup>	.10	.02	-.02	.06
<b>TOTAL</b>			<b>-.31<sup>***</sup></b>	<b>-.46</b>	<b>-.16</b>

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Multigroup comparison of the parsimonious model of stuttering severity on school competence via negative communication attitudes and maladaptive perfectionism suggested that the model applied to AWS and NSA ( $\Delta\chi^2(5) = 7.01, ns$ ). The model fit the data reasonably ( $\chi^2/df = 1.32$ , RMSEA = .05, SRMR = .03, CFI = .99), and explained 28.7% of variance in school competence.

### 3.3.3.3. Explaining the relationship between stuttering severity and close friendship

Mediation analyses for *close friendship* competence on the total sample resulted in a significant total indirect effect through the set of mediators (see Table 4). Stuttering severity again did not influence the perception in the domain of close friendship independent of its effect through the mediators ( $c'$  path:  $b = .03$ ,  $SE = .05$ ,  $\beta = .08$ ,  $ns$ ).

The results of the indirect effects showed that negative communication attitudes acted as mediator. Greater stuttering severity is related to more negative communication attitudes, which in turn led to a more negative close friendship self-esteem. Adaptive and maladaptive perfectionism, perceived stigma and non-disclosure of stuttering did not act as mediator. This was partly because of no significant relationship to close friendship.

**Table 4**

Mediation of the effect of stuttering severity on close friendship, through negative communication attitudes, adaptive and maladaptive perfectionism, and perceived stigma and non-disclosure of stuttering. Standardized estimates are reported.

	<i>a</i>	<i>b</i>	<i>ab</i>	Percentile bootstrap 95% CI	
				Lower	Upper
<i>Neg communication attitudes</i>	.64 <sup>***</sup>	-.45 <sup>**</sup>	-.29 <sup>**</sup>	-.45	-.12
Maladaptive perfectionism	.37 <sup>***</sup>	-.02	-.01	-.09	.07
Adaptive perfectionism	.15	-.01	-.00	-.04	.04
Perceived stigma	-.04	-.09	-.00	-.03	.02
Non-disclosure of stuttering	.19 <sup>*</sup>	-.01	-.00	-.04	.04
<b>TOTAL</b>			<b>-.30<sup>**</sup></b>	<b>-.45</b>	<b>-.15</b>

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Multigroup comparison of the parsimonious model of stuttering severity on close friendship via negative communication attitudes suggested that the model applied to both stuttering and non-stuttering adolescents ( $\Delta\chi^2(2) = 0.17, ns$ ). The model fit the data well ( $\chi^2/df = 1.54, RMSEA = .06, SRMR = .05, CFI = .98$ ), and explained 15.8% of variance in close friendship.

#### 3.3.3.4. Explaining the relationship between stuttering severity and global self-esteem

Results for *global self-esteem* ( $N = 131$ ) also indicated a significant total indirect effect through the set of mediators (see Table 5). The direct path of stuttering severity remained significant when mediators were taken into account. Remarkably, the direction of the path changed. This is a statistical adaptation, indicating that more than complete mediation occurred ( $c'$  path:  $b = .12, SE = .05, \beta = .22, p < .05$ ).

**Table 5**

Mediation of the effect of stuttering severity on global self-esteem, through negative communication attitudes, adaptive and maladaptive perfectionism, and perceived stigma and non-disclosure of stuttering. Standardized estimates are reported.

	<i>a</i>	<i>b</i>	<i>ab</i>	Percentile bootstrap 95% CI	
				Lower	Upper
<i>Neg communication attitudes</i>	.64 <sup>***</sup>	-.47 <sup>***</sup>	-.30 <sup>***</sup>	-.45	-.14
<i>Maladaptive perfectionism</i>	.37 <sup>***</sup>	-.32 <sup>*</sup>	-.12 <sup>*</sup>	-.22	-.01
Adaptive perfectionism	.15	-.03	-.00	-.04	.03
Perceived stigma	-.04	.05	-.00	-.02	.02
Non-disclosure of stuttering	.19 <sup>*</sup>	-.01	-.00	-.04	.04
<b>TOTAL</b>			<b>-.42<sup>***</sup></b>	<b>-.58</b>	<b>-.26</b>

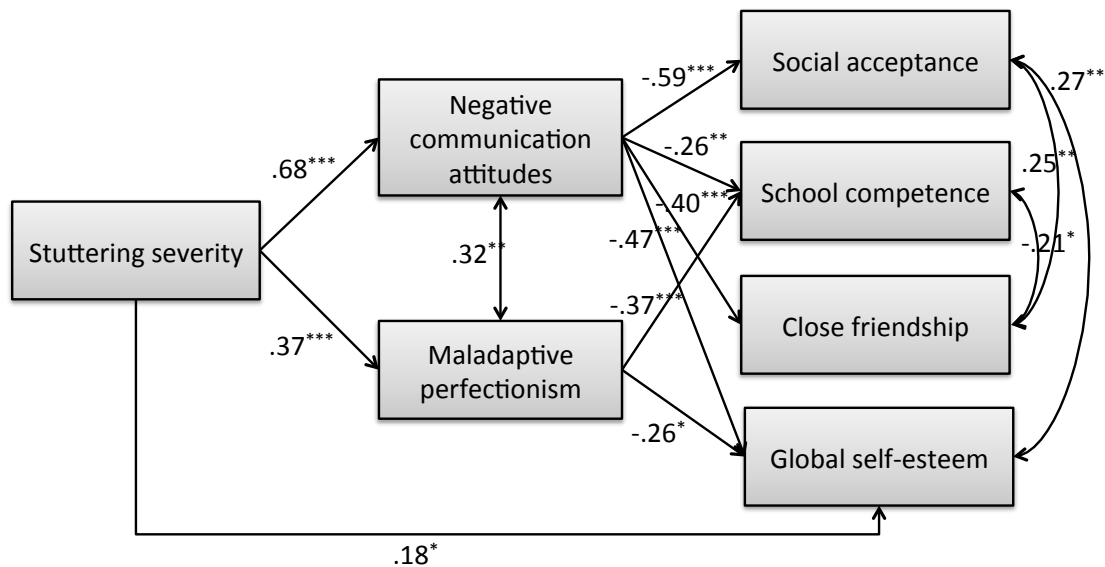
\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

The results of the indirect effects showed that particularly negative communication attitudes and to a lesser extent maladaptive perfectionism, acted as mediator. Greater stuttering severity is related to more negative communication attitudes and more maladaptive perfectionism, which in turn led to a more negative global self-esteem. Adaptive perfectionism, perceived and non-disclosure of stuttering did not act as mediator. Similarly to the other domains, this was partly because of no significant relationship to global self-esteem.

Multigroup comparison of the parsimonious model of stuttering severity on global self-esteem via negative communication attitudes and maladaptive perfectionism suggested again that the paths are similar in both study groups ( $\Delta\chi^2(6) = 9.00, ns$ ). The model fit the data well ( $\chi^2/df = 1.38, RMSEA = .05, SRMR = .03, CFI = .99$ ), and explained 42.1% of variance in school competence.

#### *3.3.3.5. Synthesis model of mediation analyses*

Finally, considering the significant covariances between different domains of self-esteem (see Figure 4), a synthesis model was tested containing the effect of stuttering severity on social acceptance, school competence, close friendship competence, and global self-esteem through negative communication attitudes and maladaptive perfectionism. As expected, multigroup comparison of the synthesis model suggested that the model shown in Figure 4 applied for stuttering and non-stuttering adolescents ( $\Delta\chi^2(10) = 8.07, ns$ ). The model fit indices indicated good fit ( $\chi^2/df = 1.50, RMSEA = .06, SRMR = .05, CFI = .98$ ).



**Fig. 4. Synthesis model of mediation analyses.** Standardized coefficients are presented. For clarity, non-significant covariances between domains of self-esteem, and paths from the control variables are not shown, but were included in the analysis. \* $p < .05$  \*\* $p < .01$ . \*\*\* $p < .001$ .

#### 4. Discussion

The present study extended the findings of self-esteem of adolescents who stutter (AWS) and resulted in three important findings. First, stuttering has an impact on self-esteem in adolescents, such that adolescents who perceive their stuttering as more severe scored lower on specific domains of self-esteem, in particular social acceptance, school competence and the ability to make close friends and on global self-esteem. Second, when looking for an explanation in covert processes related to stuttering, we found that maladaptive perfectionism and especially negative communication attitudes fully mediate the negative influence of stuttering severity on self-esteem. Third, group comparison showed that the mediation model applies to both stuttering and non-stuttering adolescents. This indicates that the negative attitudes on communication and maladaptive perfectionism are important processes to consider with regard to the self-esteem of adolescents who are uncertain about their speaking skills, also when they do not stutter.

#### *4.1. Impact of stuttering severity on self-esteem*

The theory that self-esteem is substantially constructed based on social interactions led us to infer that stuttering could have a negative impact on self-esteem. Especially self-esteem during adolescence, a period of life characterized by increased self-consciousness, could be at risk. While different studies in adults who stutter report adverse effects of stuttering on self-esteem (Bajina, 1995; Klompas & Ross, 2004), studies in children and adolescents found no differences in self-esteem between a group of stuttering and non-stuttering participants (Blood et al., 2007; Blood et al., 2003; Yovetich et al., 2000). When comparing mean scores of domain-specific and global self-esteem between AWS on the one hand and their non-diagnosed peers on the other hand, we also did not find differences in self-esteem between these two groups of participants. However, our work differs from the previous studies in an essential aspect, that is that we took into account stuttering severity, in relation to self-esteem. We found that increased stuttering severity in our participants (AWS and NSA) predicted more negative scores on social acceptance, school competence, the ability to make close friends and global self-esteem. These domains seem to be typically the domains of the self in which communication matters most, in contrast to the other domains of self-esteem that is physical appearances, athletic competence and conduct behavior. As Yovetich et al. (2000) suggested, it is likely that because adolescents become more sensitive to social feedback, communication capacities will influence more strongly their self-esteem.

#### *4.2. Maladaptive perfectionism and negative communication attitudes mediate the impact of stuttering severity on self-esteem*

In addition, our results provide further support for the iceberg-metaphor (Sheehan,

1970), which highlights the importance and magnitude of hidden emotional and cognitive processes related to stuttering. We studied several covert processes that are frequently studied or considered relevant in relation to stuttering and self-esteem, as possible mechanisms explaining the relationship between stuttering severity and self-esteem.

Our results indicate that especially *negative communication attitudes* mediate the relationship between stuttering severity and specific domains of self-esteem (i.e. social acceptance, school competence and the ability to make close friends) and global self-esteem. Having a stutter has an impact on self-esteem of adolescents because they experience speech and communication as negative and fearful. Bloodstein and Ratner (2008) accentuated comparable attitudes in PWS; they perceive stuttering as shameful and speech as unpleasant and threatening. As a result these attitudes could develop into an increasingly rigid self-concept as stutterer (Bloodstein & Ratner, 2008). Based on our and previous studies, we assume that although children who stutter already report negative communication attitudes (Boey, 2008), it is not until adolescence that these attitudes shape their self-esteem.

Also *maladaptive perfectionism* mediates the relationship between perceived stuttering and self-esteem, particularly with regard to school competence and global self-esteem. Stuttering seems to have an adverse impact on self-esteem in adolescence because of more perfectionistic thinking in terms of fear of negative consequences and worrying about making mistakes. Brocklehurst et al. (2015) also found self-perceived disfluency to be associated with raised worrying over making mistakes in his participants. He noted that these results only reflect the participants' attitudes and beliefs that related specifically to speaking and do not constitute evidence for a link between domain-general perfectionism and stuttering. In other words, raised maladaptive perfectionism in PWS could be specifically

associated with speaking. Given the negative impact of maladaptive perfectionism on the self-esteem of adolescents and the fact that this personality characteristic is often seen in PWS (Amster, 1995), future research needs to explore the specific content of these perfectionistic thoughts.

Other cognitive and emotional processes related to stuttering that we studied did not mediate the relationship between stuttering severity and self-esteem. First, our results did not indicate a mediating role of *adaptive perfectionism*, mostly because stuttering severity did not predict adaptive perfectionistic thinking (a-path). This finding does not support the conclusions of Amster (1995) nor Brocklehurst et al. (2015). They found respectively that PWS have either unrealistically high standards (Amster, 1995) or on the contrary lower scores on adaptive perfectionism (Brocklehurst et al., 2015). Considering that adaptive perfectionism is associated with more positive outcomes (Stoeber & Rambow, 2007), which we observed for the domain of school competence (b-path), it would be beneficial to further study adaptive perfectionism in relation to stuttering to understand these contradictory results.

Second, *experienced stigma and non-disclosure* of stuttering did not mediate the relation between stuttering severity and self-esteem. Similarly to adaptive perfectionism, the extent to which adolescents experienced stigma was independent of stuttering severity (a-path). This is consistent with previous research that used a similar measurement of stigma and non-disclosure practices (Blood et al., 2003; Erickson & Block, 2013), indicating that most adolescents do not perceive their stuttering as a stigma. On the contrary, comparison of mean differences indicates more perceived stigma in non-stuttering adolescents, in comparison to AWS. It is plausible that AWS use protective mechanisms or



specific strategies to reduce perceived stigma, as also suggested by Blood et al. (2003), such as (a) making an in-group comparison rather than a comparison to a non-stigmatized or advantaged group, (b) devaluing those dimensions they are not good at, or (c) attributing negative feedback to prejudice to the group rather than their own personal doing (Crocker & Major, 1989).

In line with the behavioral theories about the development of chronic stuttering (Bloodstein & Ratner, 2008), hiding stuttering is another possible coping strategy of PWS. Indeed our results indicate that stuttering severity predicts the extent that our participants were tempted to keep their stuttering a secret (a-path). Blood et al. (2003) found a similar non-disclosure of stuttering in their participants. These results support Santrock (2011) who stated that adolescents want to hide characteristics they perceive to be negative. Finally, we did not observe an impact of non-disclosure of stuttering on self-esteem (b-path). It seems possible that non-disclosure practices of stuttering are more stressful for people with a mild stuttering severity who have a bigger chance to succeed in hiding their stuttering, than for people with a severe stutter for whom it is more difficult to keep their stuttering a secret. Or as Pachankis (2007) highlighted, the potential discovery makes possessing a concealable stigma a difficult predicament for many individuals. Further study is required to gain more insight into the specific relationship of protective or coping strategies to perceived stigma, such as non-disclosure practices of stuttering, and self-esteem. In addition, it would be beneficial to replicate the study using a more comprehensive measure of non-disclosure, considering the measure we used only included four items and had limited internal consistency.

#### *4.3. The applicability of the model for adolescents who do and do not stutter*

The items of the Subjective Screening of Stuttering instrument (Riley et al., 2004) to measure stuttering severity, were filled out by both stuttering and non-stuttering adolescents. For example, “how would you score your speech on the telephone during the last week?” The self-reported stuttering severity of both groups of participants showed considerable variability, meaning that adolescents who do not stutter also perceive themselves as more or less fluent speakers. Furthermore, the group comparison of the mediation model indicates that our conclusions applied to both stuttering and non-stuttering adolescents; the mediation model we found is applicable to a more general population of adolescents showing more or less disfluent behavior. This means that the attitudes on communication situations and maladaptive perfectionistic thoughts (whether or not specifically related to speech) are important processes to consider with regard to adolescents’ self-esteem regardless of their speaking skills.

#### *4.4. Limitations and implications for theory and practice*

We obtained information about the stuttering severity as assessed by a speech therapist (Stuttering Severity Instrument; Riley, 1994) of 33 of our AWS. These assessments, however, were not necessarily made at the time of the study, but often evaluated earlier during therapy. Moreover, although these SSI-scores correlated moderately to the self-perceived stuttering severity of the participants, it is important to emphasize that the use of a self-reported stuttering severity may be more related to our research variables of covert processes than a measurement of stuttering severity as assessed by a Speech Language Pathologist (SLP) or researcher. Research combining self-reported stuttering severity with a more objective measure could reveal whether the same results are found. In addition,

because negative self-esteem could also influence self-perceived stuttering severity, future research could focus on this bidirectional interaction. Next, this study included only three scales of the MPS, measuring the core of perfectionism (as agreed by the original author Frost, but also Shafran, Cooper, and Fairburn (2002)). However, considering the possibility that parental acceptance of the child's stuttering is not evident or not "true" to the child who stutters, it could be interesting to study, for example, the possible mediating effect of the perception of high parental expectations and criticism. Another limitation, as reported, is the low internal consistency of the non-disclosure scale. Although Blood et al. (2003) computed a factor analysis that confirmed the structure of the stigmatization and disclosure in AWS scale, a more rigorous study of the instrument is recommended. Accordingly, the non-disclosure measurement may not represent the complete picture of the desire to hide stuttering. In the current study avoidance behavior is indirectly included in the non-disclosure measurement. That is, stuttering can be hidden, probably by avoiding talking to others. However, high levels of situational avoidance may prevent circumstances for disclosure from occurring very often. As a result, the negative consequences of stuttering in front of peers may actually rarely occur, and therefore any consequential stigma would also not occur. Future studies could bring clarity by measuring specific avoidance behavior as a separate process. Additional further study may also be needed in regard to the specific needs of females and/or older adolescents who stutter, since preliminary analyses showed that girls who stutter report higher stuttering severity, more negative communication attitudes, and lower self-esteem, and older adolescents were also found to have more significant covert symptoms than their younger counterparts. Finally, following adaptive perfectionism, future studies could consider other possible positive mediating processes, for example 'agency' and 'resilience'.

Our results have important implications for theory and practice as they provide more understanding of the covert processes related to stuttering and the self-esteem of AWS. Because of a consensus among clinicians working with PWS that stuttering has a negative effect on the well-being of PWS, therapeutic attention often includes the self-esteem of clients (Van Riper, 1982). However, there was minimal empirical data observed in AWS to confirm these practices. Furthermore, although the complexity of stuttering is often emphasized, there is little insight in how different covert processes cooperate and are related to stuttering. In this regard, our results suggest that focusing on changing the negative communication attitudes and maladaptive perfectionistic thoughts will increase self-esteem in AWS. Moreover, we assume that aiming for these clinical goals will have a more positive effect on an adolescents' self-esteem than aiming for a reduction of their stuttering. While cognitive changes are every bit as important as fluency changes, both of these goals can be achieved during successful therapy. For example, cognitive behavioral therapy (CBT) in combination with stuttering modification therapy reduces both stuttering, perfectionist thoughts and negative communication attitudes (Amster & Klein, 2007). Considering the developmental cognitive and emotional challenges that adolescents in general encounter, customized professional guidance of AWS is recommended. In the same way, cooperation with other caregivers such as clinical psychologists or school counselors may be beneficial, counting on their additional knowledge in cognitive and emotional processes and insights into the daily social interactions of adolescents.

## **5. Conclusion**

In conclusion, our results support a definition of stuttering that emphasizes more the emotional and cognitive processes of stuttering. Although definitions often make note of

covert stuttering behavior, processes such as self-perceived disfluency, negative communication attitudes, maladaptive perfectionistic thinking and non-disclosure practices are worth a lot more attention in proportion to their contribution in the process of stuttering, especially in adolescence. Even adolescents who do not stutter severely could perceive their stuttering as severe and develop a negative self-esteem, underlining the importance of hidden processes (Boey, 2008). We provided evidence that these more hidden cognitive and emotional processes also need to be addressed when working with adolescents who are insecure about their fluency in general. Comparative studies in larger samples of the general population using multiple measures of disfluency could increase our understanding of the importance of cognitive and emotional processes in the development of self-esteem.

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