

Narrative Profiles of Individuals with Typical Development and Down Syndrome

Isabel Neitzel and Martina Penke

1. Introduction

Narrative abilities are an important part of children's everyday social and school life. They typically develop between the age of four and six (Neitzel & Schulte-Busch, 2020) and are related to academic success and key abilities such as reading comprehension (Griffin et al., 2004) or mathematics (O'Neill et al., 2004). Narrations can be evaluated with respect to macrostructure, which means the conventionalized structure of a story (e.g. introduction, central conflict, conclusion), and the concrete language realization (microstructure), involving for instance use of referring expressions and internal state terms as well as the syntactic structure of produced utterances. Narrative abilities are of high relevance for children with both typical and non-typical development. The development of narrative abilities is a complex process and involves several language areas such as articulation, vocabulary and grammar as well as cognitive abilities such as memory functions or Theory of Mind. Individuals with Down syndrome (DS), which is the most common chromosomal abnormality (Bald et al., 2012), display impairments in several of the language areas and the cognitive abilities that are considered relevant for narration. Thus, studies have shown that expressive morpho-syntax (Connors et al., 2018; Neitzel & Penke, 2021a; Penke, 2018; Vicari et al., 2000; Wimmer et al., 2020) as well as expressive vocabulary (Carr, 2012; Carr & Collins, 2014; Witecy & Penke, 2019) are typically limited in individuals with DS. As an example for how an impaired syntax might affect the production of narrative content, consider the production of subordinate clauses. Complex relations (e.g. temporal, causal) in narrations are mostly expressed by subordinate clauses ('Jenny is sad because the supermarket was sold out of orange juice.'). However, individuals with DS can be limited to producing sentence fragments of one or two constituents (Fowler, 1990; Neitzel & Penke, 2021a). Likewise, shortcomings in expressive vocabulary might affect the use of internal state language in narrations of individuals with DS and restrain individuals' abilities to express a character's internal states (e.g. Neitzel & Penke, 2021a). In addition, cognitive skills such as the ability to take a protagonist's view (Neitzel & Penke, 2021a) or to understand a protagonist's feelings and intentions (Theory

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of Mind, Neitzel & Penke, 2021b) are also impaired in a number of individuals with DS. Regarding their limited cognitive abilities and language impairments, individuals with DS must be categorized as a group of persons at risk of narrative impairments.

Not only related cognitive and language factors but also narrative abilities themselves might be affected in individuals with DS. While several studies have addressed narrations in persons with DS, most studies lack the involvement of both macro- and microstructural measures as well as standardized diagnostics. The Narrative Scoring Scheme (NSS; Heilmann et al., 2010) is a widely used instrument focusing on both macro- and microstructural elements in narrations. Addressing different narrative aspects, the instrument includes seven categories (e.g. introduction, cohesion, character development) with a point rating from 0 to 5 points per category and a total score of max. 35 points. The NSS can be used for every narrative transcript but provides coding examples for some often used materials. The most common of these materials is a non-verbal picture book, the so-called *Frog Story* (*Frog, where are you?*; Mayer, 2003). Although the instrument was used successfully in different clinical populations (for a methodical description see Reilly et al., 2004), it has so far rarely been used in narrative research on individuals with DS. Making use of this scoring scheme, Finestack et al. (2012) analyzed *Frog Story* narrations of 24 adolescents and young adults with DS as well as narrations of a control group of four- to six-year-old children with typical development. The authors found evidence for a mental age-appropriate narrative macrostructure but an impaired microstructure, specifically reflecting limitations in syntactic complexity. When controlling for syntactic abilities, by matching participants with respect to MLU (mean length of utterance), the narrative performative was impaired in the individuals with DS which indicates a limitation of narrative abilities in this group. In a recent investigation (Neitzel & Penke, 2021c), we described a concrete narrative profile of German-speaking individuals with DS using the NSS that indicated a relative strength in the macrostructural element introduction and concerning narrative cohesion but strong difficulties in the mediation of conflicts and solutions. The naming of the main conflicts (problem/goal) and the attempts of solution (outcome) are essential for the listener's understanding of narrations and are usually displayed by typically-developing four-year-old children. We could show that this so-called goal-outcome-strategy (Sieg Müller et al., 2012) was not acquired by most children and adolescents with DS involved in this study. Furthermore, we found expressive vocabulary to be significantly related to narrative ability, while syntactic abilities as well as general cognitive abilities were not related to narrative abilities as measured by the NSS (Neitzel & Penke, 2021c). However, due to the high heterogeneity in language abilities that is typical for individuals with DS (Fowler, 1995), the interpretation of a narrative profile is difficult without a comparison to typical language development over time. The aim of this paper is to provide this comparison and to present a detailed analysis of the narrative profile obtained from the individuals with DS studied by Neitzel and Penke (2021c) in comparison to narrations coming from three groups of typically-developing (TD) children aged three, five and nine years. If individuals

with DS perform according to their mental age reached, we would expect a performance that is comparable to the performance of the TD five-year-old children. In addition, we wanted to explore the contribution of Theory of Mind to narrative abilities of individuals with DS which has so far not been investigated in previous research on narrative abilities in individuals with DS. We assumed a close connection between Theory of Mind and narrative abilities, specifically with respect to the use of internal state language.

2. Method

Narrations produced by individuals with DS were collected from 28 German-speaking participants (mean age 14;05 years, mean nonverbal mental age 5;03 years) and have been published in Neitzel & Penke (2021c). These narrations were compared to narrations produced by 33 typically-developing (TD) children aged three (n=12), five (n=11) and nine (n=10) years that were taken from the Bamberg-corpus available on *Childes* (Berman & Slobin, 1994). These age groups allowed for comparing the narrative performance of the individuals with DS to a group of TD children matched in chronological age (TD5, age five years) to the mental age of the individuals with DS, as well as to a younger (TD3) and an older group (TD9) of TD children.

All narrations come from monolingual German individuals and are based on the *Frog Story* picture book (Mayer, 2003). The narrative transcripts were coded according to the recommendations for the *Frog Story* (Miller et al., 2003) of the Narrative Scoring Scheme (NSS; Heilmann et al., 2010) that includes seven macro- and microstructural categories which can be awarded between 0 and 5 points each (max. 35 points). One point describes immature performance, 3 points indicate developing skills whereas 5 points describe proficient performance. All NSS scorings were interrater-controlled by a second independent researcher. Mean scores over the groups were computed in *SPSS 27* to compare the narrative profiles of individuals with DS to those of the TD children. Group comparisons of individuals with DS and the mental-age equivalent control group (TD5) were computed using Mann-Whitney-U-Tests as the NSS makes use of an ordinal scale.

Theory of Mind was assessed by a false-belief task, which is used by most studies investigating Theory of Mind (Beaudoin et al., 2020), the Sally-Anne task (Baron-Cohen et al., 1985). In this test, the child witnesses a puppet play in which the protagonist Sally is subject to a false belief concerning the location of her marble which was taken away to a different location while Sally could not experience this change of location. To pass the task, the child needs to differentiate between the incomplete knowledge of the puppet and the own comprehensive knowledge about the situation. The task includes one target question ('Where will Sally look for the marble?') and two control questions ('Where is the marble now?'/ 'Where was the marble at the beginning?'). Data of all participants who passed the control questions (n=24) was included in the analyses. A group comparison of narrative performance in those individuals who pass and those who fail the Sally-Anne task was computed using Mann-Whitney-U-Tests.

3. Results

3.1. Narrative profiles in TD children and individuals with DS

For each of the NSS-categories, figure 1 shows the mean score obtained by the four groups of individuals. As expected, narrative abilities develop in TD-children from age three years, the TD-group with the lowest scores in all NSS-categories, to children aged nine years, the TD-group with the highest scores.

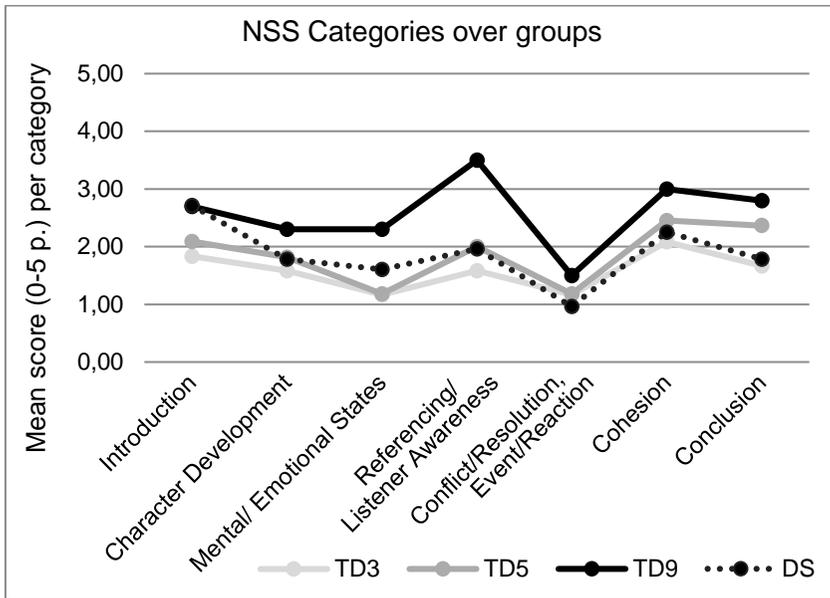


Figure 1: Narrative profiles over groups in NSS categories

A particularly pronounced step in narrative development by age nine years is evident for the categories measuring referencing skills and mental/ emotional state descriptions. Note, however, that the scores of the nine-year-old children remain on point-level 3 (developing), indicating that narrative development is still going on at this age in typical development. Individuals with DS achieved a mean NSS-score over all categories (13.07) that is not significantly different from the total score obtained by the five-year-old TD children (12.18). This finding suggests that the narrative performance observed for individuals with DS is appropriate for their nonverbal mental age overall (mean mental age of individuals with DS: 5;03 years). With respect to the discrete NSS-categories, non-parametric comparisons with the group of TD five-year olds indicated a mental age-appropriate profile for the individuals with DS, with relatively good skills in introduction (setting & characters) and expression of mental/ emotional states and a particular weakness in conclusion (story ending) compared to the group of TD5-children ($p = .054$). Individuals with DS obtained the lowest NSS score in the category conflict/resolution (mean score 0.96), with no individual achieving more than 2

points. However, as the data indicate, the realization of conflicts and resolutions is no specific weakness of individuals with DS but an outstanding weakness over all groups. Table 1 presents all means and *SD* values for each NSS-category and the total NSS score for all four participant groups and gives the results of a non-parametric statistical analysis (Mann-Whitney-U-tests) comparing NSS scores for individuals with DS to the scores of the mental age-matched five-year-old TD children.

Table 1: Mean scores achieved by typically-developing children and individuals with DS for the categories of the Narrative Scoring Scheme (NSS)

	TD3	TD5	TD9	DS	Group comparisons TD5 vs. DS (Mann- Whitney-U, p-values)
<i>Introduction</i>					.141
Mean	1.83	2.09	2.70	2.71	
<i>SD</i>	0.58	0.83	0.82	1.41	
<i>Character Development</i>					.841
Mean	1.58	1.82	2.30	1.79	
<i>SD</i>	0.79	1.17	0.95	1.13	
<i>Mental/ emotional states</i>					.171
Mean	1.17	1.18	2.30	1.61	
<i>SD</i>	1.03	1.08	0.95	0.92	
<i>Referencing/ listener awareness</i>					.948
Mean	1.58	2.00	3.50	1.96	
<i>SD</i>	0.79	0.90	0.71	1.14	
<i>Conflict/ resolution</i>					.260
Mean	1.17	1.18	1.50	0.96	
<i>SD</i>	0.58	0.41	0.53	0.58	
<i>Cohesion</i>					.630
Mean	2.08	2.45	3.00	2.25	
<i>SD</i>	0.67	0.52	0.82	1.08	
<i>Conclusion</i>					.054
Mean	1.67	2.36	2.,80	1.79	
<i>SD</i>	0.78	0.81	0.79	0.96	
Total score					.584
Mean	11.08	12,18	18.10	13.07	
<i>SD</i>	3.29	5.08	2.81	5.90	

3.2. Theory of Mind and narrative performance

To analyze a possible connection between Theory of Mind and narrative performance, a group comparison between those individuals with DS who passed ($n=9$) and those who failed ($n=15$) the Sally-Anne task was computed for the NSS total score and for the score of the subcategory mental/ emotional states of the NSS. Please note that only data of participants who passed both control questions ($n=24$) was included in the analyses and that Theory of Mind data was not available for the TD groups. Group comparisons indicated no significant differences between those individuals with DS who passed and those who failed the Sally-Anne task with respect to the NSS total score ($p = .120$). With respect to the scores achieved in the NSS category mental/ emotional states the group comparison approached significance ($p = .053$) with those individuals who passed the Sally-Anne task achieving a mean NSS score of 2.11 (SD 1.05, Range 1-4) as opposed to the score of 1.33 (SD 0.82, Range 0-3) obtained by those individuals with DS who failed the Sally-Anne task.

4. Discussion

Our findings indicate that TD-children show basic narrative abilities at preschool-age and increasing skills during school-age. Increases are highest in the categories referencing and mental/emotional states, nevertheless even the nine-year-old TD children score relatively weak in the NSS-categories with no category meeting an advanced point score of 4 to 5 points in mean. This surprises as narrative development is mostly described to take place between ages four and six and underlines that this process takes much longer time over childhood than previously expected. NSS data for 21 typically-developing children with a mean chronological age of 4.82 years (comparable to group TD5 in the current study) and a mean mental age of 4.87 years narrating the *Frog Story* is reported in a study by Finestack et al. (2012). Note that overall, the data of Finestack et al. confirms to the data of the TD five-year-old children presented here. Descriptively, the mean NSS scores of the TD children by Finestack et al. are comparable for the categories conflict/resolution, cohesion and conclusion. A more pronounced difference holds for the category mental/emotional state where Finestack et al. report a mean score of 2.24, whereas the TD children in our study only achieved a mean score of 1.18. Consequently, the mean total NSS score is slightly higher in Finestack et al.'s data (14.10) compared to our data (12.18). Despite these slight differences, data of our group of five-year old TD children goes well along with the data from Finestack et al. This specifically holds for the notably low performance in the NSS category conflict/resolution. The low point score which was achieved in this category over all groups is a main finding of the current investigation.

According to the literature the so-called goal-outcome-strategy is acquired by typically-developing children between ages four and six (Sieg Müller et al., 2012). However, even the children in groups TD5 and TD9 in the current analysis do not

show an age-adequate performance for this aspect, contrary to Siegmüller's assumption. Due to the low performance of the TD groups with respect to this category, we cannot conclude that the realization of conflicts and their resolution constitutes a particular deficit in the narrative abilities of individuals with DS, despite the low scores obtained in this category by the individuals with DS. The data only suggest that the goal-outcome strategy has not been acquired by the participants with DS – as it has not been acquired by the TD children. This leads to the methodical question, whether this finding is a specific problem of the NSS scoring of the *Frog Story*. To obtain the maximum score of five points for the category conflict/ resolution, an individual must state the two major conflicts as well as the four supporting story elements (subsidiary events) of the story with details and resolution. However, only one of the main conflicts in this story appears right at the beginning of the story and is solved at the end of the story. All other main conflicts appear close to the end of the story and are concluded shortly afterwards. It might therefore be the case that the *Frog Story* book is too long and that the emergence of fatigue effects particularly affects the identification of conflicts and their solution appearing at the end of the story. Support for this suggestion comes from the observation that many of the transcripts offer longer descriptions for the first images than for the last images of the book – an effect which occurs for the control children as well as in the group with DS. Further longitudinal research using different materials should target the age at which conflicts and resolutions are likely to be described in narrations of children with impaired and unimpaired language development.

A more pronounced difference between the narrations of the participants with DS and the TD5 children emerged for the NSS macrostructural category conclusion (p -value approaching significance). This finding suggests that in contrast to the assumptions of previous studies (e.g. Channell et al., 2015; Segal & Pesco, 2015), macrostructure might not be generally unimpaired in individuals with DS. In contrast, the two NSS categories targeting microstructure (character development and referencing) constituted no specific weakness of the group with DS in comparison to the control groups. Thus, the assumption that microstructure constitutes a particular weakness in individuals with DS (Ashby et al., 2017; Channell et al., 2015; Finestack et al., 2012) cannot be verified in our study. Ideally, more research targeting the longitudinal development of narrative abilities of individuals with DS and comparing it to the narrative abilities of TD should be conducted to confirm these observations.

Although their narrative abilities appear to be mental-age appropriate overall, it is important to state that narrative abilities of individuals with DS stay behind their chronological age in all aspects, an observation that also conforms to the findings of Finestack et al. (2012). This highlights the need to consider narrative abilities in language intervention settings. Given the relevance of narrative abilities for children's everyday social and school life and educational achievements, speech and language therapists should consider narrative abilities as a target for intervention. For German, different intervention programs such as *WeidE* (Schelten-Cornish, 2015) or *PLAN* (Ringmann, 2012) already display specific therapeutic intervention possibilities for single macrostructural elements.

In addition to the comparison of narrative abilities between individuals with DS and TD children, we aimed to explore the relation between narrative abilities and Theory of Mind abilities in our participants with DS. The ability to consider the knowledge and thoughts of a story character, its feelings and intentions seem likely to be related to narrative abilities. Thus, it has been shown that in typically-developing children, the understanding of the feelings of a protagonist supports the understanding of the story as a whole (Kim, 2015). A statistical analysis comparing the scores achieved in the NSS category mental/ emotional states ($p=.053$) between participants with DS who passed and those who failed the Sally-Anne task approached significance ($p=.053$). This is a first indication that the expression of a character's mental and emotional states is related to Theory of Mind. Unfortunately, comparable data on Theory of Mind development was not available for the TD children. Also, the group comparison between participants failing/passing the false belief test was based on a relatively small sample size. Finally, the Sally-Anne task only includes one single false-belief situation, which is a methodical limitation of this instrument. Conducting a comprehensive assessment including a full Theory of Mind battery on participants with and without typical development might be a promising research design for the future.

There are some further limitations of the current study: the investigation has only included one narrative instrument which might be of limited significance as it does not involve interactional narration and might be too long and taxing for individuals suffering from cognitive limitations. Our data analysis was based on the NSS which measures specific narrative abilities on a scale from 0 to 5 points. Although the scoring examples are helpful (but only available for points 1, 3 and 5), the scoring remains an individual and subjective process. As a further limitation, the NSS involves only two categories evaluating microstructural performance, which reduces its informativeness with respect to retained or impaired microstructural abilities.

Summarizing, our study provides a first insight into the narrative abilities of German-speaking individuals with DS in comparison to TD children. Further data is needed to confirm our findings of, overall, mental-age adequate narrative abilities in individuals with DS.

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