The Influence of a Preventative Intervention (STAP) on Psychological Adjustment in Children with Autistic Traits During the Transition to Secondary School

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Abstract

One challenge for all children in their educational career is the transition from primary to secondary school. Especially for students with autistic traits, namely peculiarities in social style and pragmatic adaptation to the environment, this time can be marked by problems of psychological adjustment. The Systematic Transition in Education Programme for Autism Spectrum Disorder (STEP-ASD) has been conceptualized to ease the transition to secondary school for students with ASD. This study examined the effectiveness of the STEP-ASD for the Dutch version of the program (STAP), while expanding the scope to children with autistic traits. I investigated the level of psychological adjustment for all students before, shortly after, and one year after the transition as well as the (longterm) facilitatory effect of the STAP. Psychological adjustment was measured with the Strengths and Difficulties Questionnaire Teacher report (SDQ-TP) in a Dutch sample (N = 54, M age = 12.14 years), using an unblinded, matched participants, controlled design. Contrary to my expectations, emotional and behavioral problem scores were highest during the last months of primary school (M = 13.58) and decreased after the transition (M = 9.26). Additionally, differences in scores after transition between the STAP (M = 9.31) and the control condition (M = 9.21) were non-significant, indicating no facilitatory effect of the STAP intervention. These findings suggest that characteristics of secondary school might even contribute to the psychological adjustment of students. Future studies should investigate the relationship of autistic traits, psychological adjustment, and school characteristics in a larger, more diverse sample.

Keywords: school transition, autistic traits, intervention, psychological adjustment

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Approximately 1 in 160 children worldwide is diagnosed with autism spectrum disorder, with numbers rising every year (WHO, 2021). Characteristics of ASD include deficits in social interaction, communication and behavioral flexibility (American Psychiatric Association, 2013). Since autism has been conceptualized as a spectrum disorder, it can be assumed that people diagnosed with ASD display the upper extreme of traits which can also be measured in the general population (Hoekstra et al., 2007). A subclinical manifestation of such traits, hereafter called autistic traits, can be summarized as significant peculiarities in social style, perception of self and others, and pragmatic adaptation to the environment (Constantino & Todd, 2003). Possessing such traits may lead to difficulties in various aspects of a child's life, especially in the academic and social field. Therefore, the number of children facing challenges similar to, but different in degree as children with an ASD diagnosis would most likely be higher than the number reported by the WHO.

One challenge for all children in their educational career is the transition from primary to secondary school (Zeedyk et al., 2003). The move from a smaller and more personal environment to a physically larger and impersonal one involves some problems of adjustment for the majority of children and creates a time when adequate support is essential (West et al., 2010). Overall, students are required to adapt to this ecological shift as well as organize themselves and their school-work much more independently (Coffey, 2013). The main challenges posed by the transition are characterized by discontinuity in physical location, alienation from peer groups and insecurity in teacher relationships (Ashton, 2008). Although there appear to be difficulties for all children during the time of transition, the challenges for children with established problems of adjusting to new environments and peculiarities in social situations seem to be of even greater concern.

As children with ASD are increasingly receiving their education in mainstream schools, many of them will be faced with the same challenge as children with autistic traits, namely transitioning from primary to secondary school (Mandy et al., 2016). However, no methods have been developed for children with autistic traits (as opposed to ASD) to tailor to their needs, especially during the transition process from primary to secondary school. In 2018, Nuske and colleagues found only one evidence-based intervention for children with ASD during their school transition, namely the Systematic Transition in Education Program for Autism Spectrum Disorder (STEP-ASD) by Mandy and colleagues (2016). This study is one of the first to examine the effectiveness of the dutch version of this intervention program, namely the STAP (Tjaarda et al., 2021) on psychological adjustment in children with autistic traits during the transition to secondary school in the Netherlands.

The matter that students experience difficulties during the transition from primary to secondary school has been well-established in literature. However, the number of studies focusing on the transition process for children with ASD specifically, let alone autistic traits, is still growing. Makin and colleagues (2017) focused on the crucial child-, school- and system-level factors

influencing the process of transitioning primary to secondary school in children with ASD. The finding of their study was consistent with the current body of research, namely that autistic children experience difficulties adjusting to, and coping in, their new secondary placements. These concerns are not unique to children with ASD but tend to be more extreme by degree (Makin et al., 2017). According to Makin et al. (2017), difficulties that seem to be of particular concern for autistic children during their transition include sensory issues, difficulties with organization, and problems with developing and maintaining peer relationships. A study by Mandy and colleagues (2016b) specifically focused on a hypothesized escalation of problems in children with ASD after their school transition. Their findings were not consistent with their expectations, as parents, teachers, and the children with ASD did not report any overall increase in psychopathology over the transition period. Nevertheless, adaptive behavior and communication was found to be lower at secondary than at primary school by teacher report, suggesting that difficulties are most observable in the school context. This highlights the importance of integrating teachers not only actively in the transition process but also in the evaluation of the childrens' psychological adjustment at secondary school.

Overall, in light of the limited body of research on the transition process from primary to secondary school for students with ASD, even less is found about the effects for students with autistic traits who are making the transition. A recent study by Whelan and colleagues (2020) focused on the association between autistic traits and successful transition to mainstream secondary school. Students with autistic traits reported improved Quality of Life (QoL) and mental health after the school transition. This finding is contrary to most previous research. The authors argue that besides the challenges the school transition bears, it also brings the opportunity to start afresh for students. Despite the promising findings, Whelan et al. (2021) emphasize the significant association of autistic traits with mental health as it highlights the need for schools to be aware that students with subclinical autistic traits may have unrecognized support needs that are not being met.

Accordingly, the STEP-ASD preventative intervention program by Murin, Hellriegel & Mandy (2016) was designed to reduce the risk of emotional and behavioral problems in young people with ASD making the transition to secondary school. The manualized intervention tries to modify the school environment before, during and after the transition to improve the fit between the individual and their educational environment.

Mandy and colleagues (2016) evaluated the effectiveness of the STEP-ASD in reducing behavioral and emotional problems. The study was used to pilot the STEP-ASD and assess its feasibility and acceptability to teachers. Results of the study indicated that the STEP-ASD was able to reduce teacher-reported emotional and behavioral problems across the transition from primary to secondary school. This was measured using the Strengths and Difficulties questionnaire (SDQ). Nevertheless, the study by Mandy and colleagues (2016) did not employ a randomized controlled design and some researchers conducting the study took part in the establishment of the STEP-ASD and are thus experts in its employment. This might have influenced the program's effectivity and

decreased its generalizability to researchers who have not been involved in the development of the program.

Hence, the current study is one of the first to replicate the findings of the effectiveness of the STEP-ASD (Mandy et al., 2016) for the Dutch version of the program (STAP) (Tjaarda et al., 2021), while not only focusing on children with an ASD diagnosis, but also expanding the scope to children with subclinical autistic traits. This study will be based on the MOVING Project which focuses on the effectiveness of the STAP method in an experimental design in the Netherlands. The STEP-ASD has been translated and adjusted to the Dutch school system by researchers of the MOVING project. Additionally, as it is expected that children with autistic traits show difficulties and might benefit from support during the transition from primary to secondary school, the STAP method has been expanded to also include children with autistic traits in the program. Like Mandy and colleagues (2016), I am interested in the school-related emotional and behavioral problems and will hence focus on teacher-reported scores of the SDQ as primary outcome measure. It is expected that difficulties will be most observable in the school-context and by teachers who have a lot of experience with students making the transition from primary to secondary school. Therefore, it seems reasonable to assume that teachers might be most likely to acknowledge differences of emotional and behavioral problems in students receiving or not receiving the STAP method.

Overall, this study focuses on the extent to which the STAP method can help children with autistic traits during the transition period to secondary school with their teacher-reported psychological adjustment. I hypothesize a change in problem scores for all students over time during the transition. I expect elevated problem scores a few months after transition (T1) compared to their scores during the last months of primary school (T0). Secondly, I expect the STAP method to be successful in reducing emotional and behavioral problems in students after the transition. I hypothesize the problem scores to be at a lower level for students receiving the STAP program compared to controls after their transition (T1). Finally, I expect the STAP method to have a long-term effect on psychological adjustment and easing the transition to secondary school. I therefore hypothesize the effect of the STAP in facilitating psychological adjustment to be present also one year after transition (T0 v T2) compared to controls.

Method

Design

The study presents as a randomized experimental controlled trial with matched participants testing the influence of the STAP on psychological adjustment during the transition to secondary school. The outcome measure of psychological adjustment is assessed at three different time points. One independent variable in this study is group as between-subjects factor with two levels, namely the STAP intervention group or the ‘transition as usual’ control group. The second independent variable is time as within-subjects factor with three levels, namely measuring the level of psychological adjustment before transition (T0), shortly after transitioning to secondary school (T1), and one year after transition (T2).

Participants

The MOVING project took place in elementary and later secondary schools in Zuid-holland. For a child to be included in this study, all of the following criteria had to be met: (1) problems with social communication or flexibility reported by primary school teachers and (2) receiving education at a regular Dutch school in Zuid-holland. Children from the final year of secondary school (*N* = 54 at T0), their parents and primary school teachers (*N* = 53) were included in the first round of questionnaires. About 45.6% (*N* = 26) of the students were female. The mean age of participants was 12.14 (*SD* = .49), with a minimum age of 10.53 and a maximum age of 13.26 years old. Participants were matched based on gender and level of secondary school education, then the participants were randomly assigned by coinflip to either the control condition or the STAP condition. Table 1 shows characteristics of the whole student sample per group. Primary school teachers were aged between 23 and 64 years (*M* = 37.44, *SD* = 11.73) and had a mean of 13.80 years of working experience at regular primary education. Most primary teachers were female (80.7 %). Mentors at secondary school had a mean age of 39.35 years, with a minimum age of 21.45 and a maximum age of 65.81. Additionally, a slight majority of secondary school mentors were female (54.4%).

Table 1

Characteristics of Pupils

Variable	*N* Total (%)	*N* Control Condition	*N* STAP Condition
Diagnoses			
No diagnosis/ unknown	20 (37.0%)	8	12
Other diagnosis [a]	12 (22.2 %)	5	7
ASD diagnosis	6 (11.1%)	3	3
ASD and other diagnosis	4 (7.4 %)	0	4
Other type of problem [b]	1 (1.9 %)	1	0
Educational level			
VMBO [c]	32 (59.3 %)	15	17
VMBO/ HAVO	5 (9.3%)	2	3
HAVO	6 (11.1 %)	3	3
HAVO/ VWO	3 (5.6 %)	2	1
HAVO /MAVO	1 (1.9 %)	1	0
VWO	6 (11.1 %)	3	3
Praktijk pro klas	1 (1.9 %)	0	1

Note. [a] Other diagnoses include ADHD, ADD, ODD, DCD, anxiety disorders, dyslexia. [b] Other type of problem include light intellectual disability and large difference in verbal and nonverbal capabilities. [c] VMBO includes all subtypes of VMBO (i.e., VMBO-B, VMBO-G, VMBO-K, VMBO-T, VMBO LWOO).

STAP

The STAP (Tjaarda et al., 2021) has been translated from the STEP-ASD (Murin et al., 2016), adapted to the Dutch school system and its scope has been expanded by also including children with autistic traits. The transition supervisor is a trained education professional, appointed to a specific

student, who monitors and coordinates the student's transition. Like the STEP-ASD, the STAP consists of the following four stages (Appendix A).

(1) Screening questionnaires are filled out by the children participating in the STAP method, their parents, and the primary school teacher. They are used to prioritize the strengths and weaknesses of a child.
(2) Next, the bridge meeting is scheduled by the transition supervisor. The bridge meeting takes place in spring before the pupil makes the transition to secondary school. The bridge meeting includes the teachers of primary and secondary school, the transition supervisor, the parents as well as the pupil. The goal of the meeting is to identify the learner's support needs and gather all information needed to develop the transition plan and a student profile.
(3) The transition plan (or OverSTAPplan) is established after the bridge meeting by the transition supervisor. The OverSTAPplan is a working document in which everyone involved in supporting the pupil can help shape the support during the transition from primary to secondary education.
(4) As a summary of the OverSTAPplan the student profile is established. The student profile only contains the most important information about the pupil and their needs of which the secondary teacher should be aware of.
(5) Finally follows the transition to secondary school and the implementation of the OverSTAPplan.

Measures

The teacher-completed SDQ (Goodman, 1997) was used to assess the student's psychological adjustment by measuring their emotional and behavioral problems. It consists of 25 items measuring internalizing and externalizing difficulties on five subscales. The subscales include Emotional Symptoms, Conduct Problems, Hyperactivity/Inattention, Peer Relationship Problems and Prosocial Behavior. Each subscale includes a three- point Likert scale ranging from 'Never' = 0 to 'Certainly True' = 2. As this study investigates the overall psychological adjustment of students, I will focus on the total problem score instead of individual subscale scores. Reliability and validity of the SDQ were established in a large national sample of adolescents in the UK (Goodman, 2001), and specifically in a Dutch community sample (Muris et al., 2003). Similarly, the reliability and validity of the teacher-reported version have also been established in a large sample in the Netherlands (van den Heuvel, 2017).

Procedure

The study was approved by the Medical Ethics Review Board of Erasmus Medical Centre in Rotterdam. The research was conducted in the regions of Rotterdam, Alphen aan den Rijn, and Gouda; the method was used in primary schools and then in secondary schools in these regions. In collaboration with educational partnership-organizations (samenwerkingsverbanden) in these regions, the schools were approached in January 2018 and 2019 and asked whether they wanted to participate in the study. When they gave their consent, teachers from the school were informed about the STAP method and the current study. Afterwards, teachers who agreed to participate in the study were

provided with a description of the type of child which meets typical behaviors of autistic traits (i.e., problems with social communication and/or flexibility) and asked whether students in their class seem eligible for the study based on their characteristics. After parents of the student gave their informed consent, they were asked to fill out screening questionnaires. Simultaneously, education specialists of the 'samenwerkingsverbanden' were trained to become transition supervisors.

Appendix A gives a brief overview of the structure of the current study. The first round of questionnaires took place in March of the last year in primary school. Questionnaires were digitally distributed to the teachers. In April, after the first round of questionnaires, students were matched based on gender and level of secondary school education. The participants were then randomly assigned to either the control condition or the STAP method. In May, before transitioning, the bridge meeting took place for students in the STAP group, preferably at the secondary school. Students in the control condition experienced the transition as usual. In the Netherlands, this usually means that primary and secondary school teachers have a short 10-minute meeting per student transitioning.

After the transition, mentors at secondary school were informed about the STAP method and introduced to the transition supervisor. In October, shortly after transition, the second round of questionnaires took place. Mentors who knew the child best were asked to provide the information. As mentors were asked to make use of the STAP strategies and the student profile, data were not provided blindly to whether the child was receiving the STAP method.

The last round of questionnaires took place in May after transitioning to secondary school. Mentors were again asked to fill out the SDQ online. All participants received a small gift for participating. In addition, the participating schools received the STAP method after the research has been completed.

Results

This study examines the extent to which the STAP method can help children with autistic traits during the transition from primary to secondary school with their teacher-reported psychological adjustment.

To examine the effect of the transition itself on psychological adjustment, a paired samples t-test was used, comparing differences in means of problem scores before the transition (T0) and after the transition (T1). All assumptions for the paired samples t-test were met (Appendix B1, B2). Group differences in psychological adjustment before and after the transition were examined using a 2x3 mixed analysis of variance (ANOVA), with 'time' (T0 v T1 v T2) as within-subject factor and 'group' (STAP v Control) as between-subject factor. Testing of the assumptions revealed that the assumption of normality is slightly violated (Appendix B3). Still, ANOVA is expected to be robust against slight violations of normality (Schmider et al., 2010). Additionally, Mauchly's test indicated that the assumption of sphericity has been violated ($\chi 2(2) = 14.22$, $p < .001$), therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\varepsilon = 0.726$) (Appendix B4). An

analysis of equality of error variances using Levene's test indicated that the assumption of homogeneity of variance was met (Appendix B5).

Analysis of within-subjects factor 'time'

As hypothesized, there was a significant main effect of 'time' on SDQ problem scores with a large effect size ($F(1.45,45.0) = 12.40$, $p < .001$, $\eta_p^2 = .286$). Contrary to my expectations, an analysis of estimated marginal means (EMM) for 'time' shows that SDQ problem scores generally decreased over the course of the transition (Table 2). A paired samples t-test confirmed that scores were significantly higher before the transition and decreased a few months after transition to secondary school, $t(31) = 5.45$, $p < .001$, $d = .980$.

Therefore, the study can support the overall claim that the transition itself from primary to secondary school does influence psychological adjustment of all students. Still, contrary to the hypothesis, problem scores decreased after transition to secondary school and psychological adjustment improved.

Table 2

Estimated Marginal Means of Psychological Adjustment across all three time points

				95% Confidence Interval	
time	*N*	*M*	*SD*	Lower bound	Upper bound
T0	53	13.58	1.0	11.34	15.82
T1	34	9.26	.9	7.41	11.11
T2	33	8.76	.7	7.22	10.31

Analysis of between-subjects factor 'condition'

Contrary the hypothesis, there was no significant main effect of the between-subjects factor 'condition' on SDQ problem scores (F (1, 29) = .61, p = .44, η_p^2 = .02). An analysis of estimated marginal means shows that overall participants performed similarly for the STAP condition (M = 10.15, SE = 1.12, 95 % CI [7.86, 12.44]) and the control condition (M = 11.30, SE = .95, 95% CI [9.35, 13.25]). The EMM for the STAP condition clearly show the highest SDQ problem scores at T0 (M = 14.00, SE = 1.38, 95% CI [11.16, 16.84]) and a decrease in problems scores for T1 (M = 8.61, SE = .86, 95 % CI [6.86, 10.36]) (Figure 2). For the control condition an analysis of EMM revealed a similar pattern, namely higher SDQ problem scores for T0 (M = 12.77, SE = 1.63, 95% CI [9.42, 16.11]) than at T1 (M = 7.54, SE = 1.01, 95 % CI [5.48, 9.60]) (Figure 2). An independent samples t-test was used to test whether the mean difference of scores between the two conditions significantly differs per time point (Table 3). Mean differences of scores were not significant, indicating no significant effect of the STAP method on psychological adjustment compared to the control condition for T0 as well as for T1.

Thus, based on these results, I cannot support the hypothesis that the STAP is successful in facilitating the transition from primary to secondary school, as psychological adjustment of the STAP and the control group do not significantly differ.

Figure 2

Estimated marginal means of 'condition' for T0 and T1

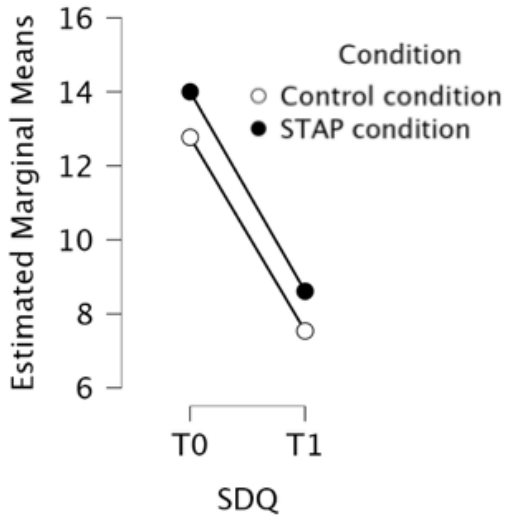

Table 3

Independent Samples t-test used to Compare Mean Differences Between STAP and Control Group per Time Point

		t	df	One-sided *p*	*M* difference	*SE* difference
T0	Equal variances assumed	.41	51	.34	.68	1.67
T1	Equal variances assumed	-.07	32	.47	-.12	1.75

Finally, there is no significant longterm effect of the STAP method on psychological adjustment (F (1, 28) = 1.38, p = 0.25, η_p^2 = .05). Emotional and behavioral problem scores stayed moderately stable for both conditions from T1 to T2 (Figure 3). Pairwise comparisons of mean differences of EMM for both conditions indicated that the mean difference of SDQ scores at T1 and T2 did not significantly differ for both groups independently (Table 4).

Figure 3

Estimated Marginal Means of 'condition' for T1 and T2

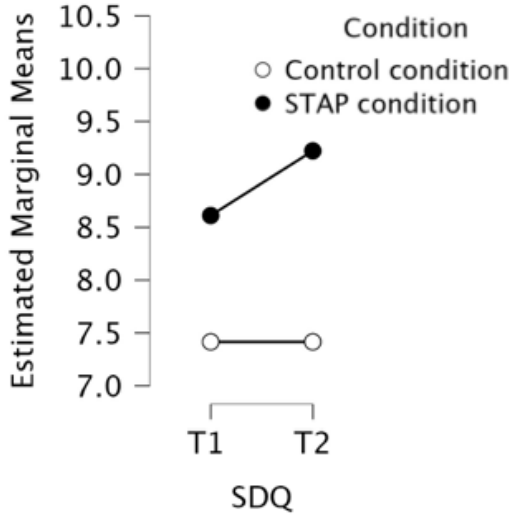

Table 4

Pairwise Comparisons of Mean Differences of Estimated Marginal Means for STAP and Control Condition for T1 and T2

Research condition	(i) time	(j) time	*M* difference	*SE*	*p*
Control Condition	T1	T2	1.51	1.00	.13
STAP Condition	T1	T2	-.58	.86	.51

Discussion

The aim of the current study was to examine the effect of the transition to secondary school on psychological adjustment of students with autistic traits. Moreover, I investigated the extent to which the STAP method can help children with autistic traits during the transition period to secondary school with their teacher-reported psychological adjustment.

Contrary to the first hypothesis, problem scores decreased after the transition for all students, although the transition did have a significant effect on psychological adjustment. Thus, the transition from primary to secondary school seemed to have a positive effect on emotional and behavior problems as opposed to elevating problem scores a few months after the transition. This finding runs counter to the prevailing view in literature (Makin et al., 2017; Mandy et al., 2016; Nuske et al., 2018) but is in line with findings of an Australian school-based study that also investigated the association between successful school transition and autistic traits in students (Whelan et al., 2021). Students with higher autistic traits reported improved quality of life and mental health after transitioning to secondary school (Whelan et al., 2021). This might speak for the notion that despite common belief that secondary school presents with numerous difficulties and obstacles for students with autistic traits, it might also bring advantages and the possibility to start afresh.

One speculation why primary school might also bear disadvantages for students with autistic traits is that students share the same classmates throughout the years of primary school. Although this might initially seem beneficial for students with problems of adjusting to new (social) environments, they may have established a certain peculiar reputation, hindering them in establishing meaningful relationships (Whelan et al., 2021). Despite their challenges with social situations, higher functioning ASD students and students with autistic traits are tremendously aware of their social status and often desire a reciprocal friendship (Locke et al., 2010). When these expectations are not met, emotional and behavioral problems may surface, perpetuating the cycle between these interrelated constructs. It seems that specifically for students with autistic traits the possibility of entering new social relationships and not being dependent on the same group of peers might act as a protective factor for psychological adjustment, constituting one of the reasons why psychological adjustment actually improved after the transition to secondary school in this study.

Also, qualitative literature reports that some students with ASD prefer the educational environment of secondary school (Neal & Frederickson 2016). A greater variety of subjects may allow students to align their studies with their preferred area of interest and greater autonomy to direct their

own learning (Neal & Frederickson, 2016). However, these findings were based on interview questions with a strength-based approach and specifically focused on the positive aspects of transition. Therefore, it is likely that students' responses were biased towards their positive rather than negative experiences.

Alongside these promising ideas for possible areas of growth at secondary school and disadvantages of primary school, one must take the possibility of overreporting problems in primary school into account as another possible explanation for the large differences in psychological adjustment before and after the transition. Primary school teachers recommended the students they considered to be experiencing the most problems for the study and simultaneously reported the level of psychological adjustment before the transition. Mentors at secondary school might not know the child very well yet or be more openminded towards the child's behavior, possibly labeling it as less problematic than primary school teachers did.

Contrary the hypothesis, I did not find a significant effect of the STAP method in facilitating the transition from primary to secondary school by improving psychological adjustment. This finding might be due to the fact that overall students did not show a high level of emotional and behavioral problems, indicating a favorable psychological adjustment. Thus, the level of disturbance may not be high enough to show effectiveness of the STAP.

Additionally, the effectivity of the STAP is largely dependent on the mentor's application of the STAP strategies during the time after transition. Accordingly, the degree to which mentors actually applied these strategies differed notably, especially as students did not seem to be experiencing difficulties and in need of further support strategies. Thus, the full potential of strategies included in the STAP program may not have been used, possibly explaining its nonsignificant effect on psychological adjustment. Respectively, mentors were not blinded and aware of the student's areas of concern as they were involved in applying the STAP strategies, present at the bridge meeting and were handed over the OverSTAPplan. This exacerbates the probability of being biased in their judgement and evaluation of the students' behavior. Mentors might have been more likely to focus on students in the STAP condition than on students in the control condition and even notice slight problems in psychological adjustment while more problems of students in the control condition might go unnoticed. This could be one possible reason for the modest difference in scores between the two groups, especially as this study relies on teacher-reports. A similar explanation has been coined the 'reverse halo effect' or 'horn effect' (Marucci et al., 2021, which means that children exhibiting problem behavior in one area are more likely to be rated problematic in other areas as well, due to the impact of one class of behavior on the perception of another one.

Furthermore, the third hypothesis of this study focused on the longterm effect of the STAP. The longterm effect of the STAP was stable and not significant throughout the first year of secondary school. Psychological adjustment stayed stable too, speaking for a longterm effect of the transition itself and more specifically secondary school teaching, as opposed to an effect of the STAP. A

possible explanation for the improved psychological adjustment after transition has been coined the ‘honeymoon period’ (Whelan et al., 2021), where the novelty factor of the new school is still fresh and their psychological adjustment biased. Nonetheless, results of the current study showed that the level of psychological adjustment did not significantly differ a few months after transition compared to one year after transition, indicating the possibility of a positive longterm effect of the transition (rather than the intervention), thus likely speaking against a honeymoon effect.

Strengths and Limitations

Strengths of this study include the use of the STAP, the adapted version of the STEP-ASD. This means the intervention was specifically adapted to the sample of Dutch students as well as sensitized to also include students with autistic traits. By including students with autistic traits this study is also more inclusive than previous ones and able to make claims for a broader target population. Additionally, this study includes a longitudinal design, not only focusing on psychological adjustment shortly before and after the transition but also how psychological adjustment developed one year later. Finally, by replicating the findings by Mandy and colleagues (2016), this study gives a perspective of how application of the STEP-ASD (STAP) looks like without including the actual inventers of the method in the implementation.

One limitation of this study is a relatively small sample size and limited statistical power. Due to attrition the sample size decreased especially after the transition (Table 2). Additionally, this study particularly only relied on teacher-reported psychological adjustment in students. Moreover, the sampling procedure of this study was based on teachers recommending students which seem eligible for the study. One shortcoming this involved is the possibility of teachers recommending students which possibly not completely fulfill all requirements and characteristics of autistic traits. These students might therefore not be particularly impaired by the transition.

Future directions

Results of this study indicated that students with autistic traits experienced elevated emotional and behavioral problems specifically before the transition, during their last months of primary school. This speaks in favor of the conjecture that students with autistic traits do encounter challenges at school and specifically primary school. Follow-up experiments of this study should particularly focus on the relationship of primary school teaching and the psychological adjustment of students with autistic traits. It is mostly speculative which aspects of secondary school benefit students or which aspects of primary school might cause difficulties for students. For now, it seems plausible to suggest future studies to include the influence of social relationships and teacher-student relationships as focus. As already established, students with autistic traits value the quality of their social relationships as important aspect of their school life (Richter et al., 2019) and these relationships can act as a protective barrier against bullying and teasing (Locke et al., 2010). Theoretically, the overall concept of primary school seems more consistent, stable and favorable for students with autistic traits which is why especially third variables like bullying and teacher-student relationships should be taken into

consideration as explanatory factors for problems of psychological adjustment. Based on the limitations of this study, it will also be important to be more concise in sampling procedures in future studies to avoid teachers recommending students not fully eligible for the study. Taking student- and parent-reports into consideration might be valuable if blinding teachers is also impossible in future studies. Additionally, to better evaluate the effectiveness of the STAP a perfectly suitable and more diverse sample is important while also more strictly monitoring the application of the STAP strategies throughout the year after the transition.

Conclusion

Overall, this study emphasizes the importance of further exploration of how autistic traits are related to various aspects of school characteristics. Although, the hypothesis that transitioning to secondary school aggravates psychological adjustment of students with autistic traits was not supported, the results of this study shed light on a different matter. Students with autistic traits might actually have more support needs which should be met at primary school already. In case more studies find support for this notion, this might speak in favor of a light school intervention with strategies and characteristics similar to the STAP but tailored to the enrollment for primary school. Still, this is only supposition and should be seen in light of the limitations of this study. In spite of that, it seems reasonable to already give students strategies at hand which might make their primary school experience more favorable and would simultaneously benefit them during their transition to secondary school.

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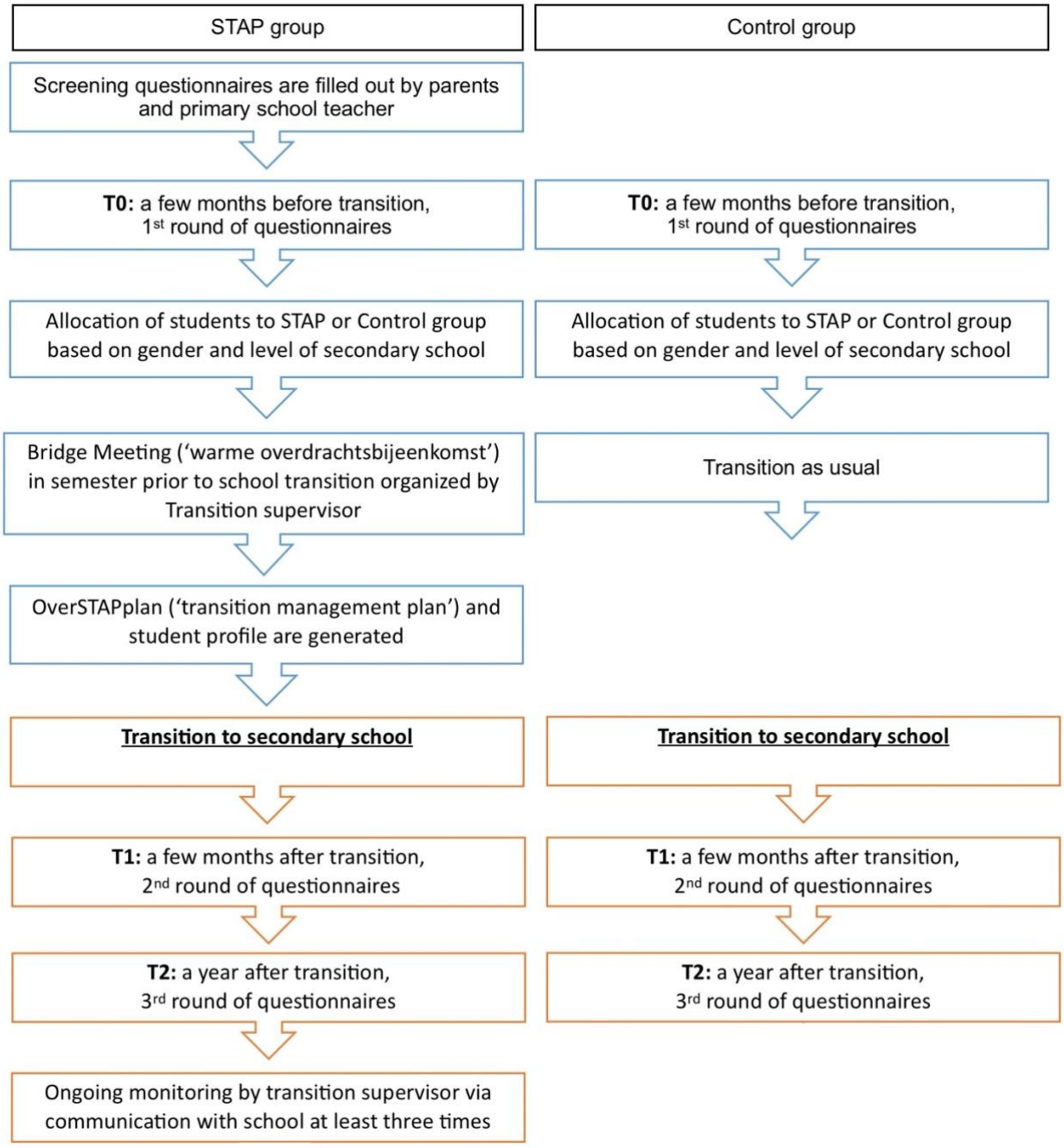
Appendices

Appendix A:
Structure of current study



Appendix B: Testing of Assumptions
Appendix B1

Test of Normality for paired samples t-test

Variable	Kolomogrov Smirnov Statistic	df	*p*	Shapiro-Wilk Statistic	df	*p*
Difference between T0 and T1	.14	31	.14	.97	31	.52

Appendix B3

Test of Normality for ANOVA

Time	Kolomogrov-Smirnov Statistic	df	*p*	Shapiro-Wilk Statistic	df	*p*
T0	.12	33	.20	.96	33	.28
T1	.20	33	.00	.91	33	.01
T2	.16	33	.03	.92	33	.02

Appendix B4

Mauchly's Test of Sphericity to Test Assumption of Sphericity for ANOVA

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	*p*	Greenhouse-Geiser	Epsilon Huynh-Feldt	Lower-bound
time	.62	14.22	2	<.001	.73	.78	.50

Appendix B5

Levene's Test of Equality of Error Variances to Test Assumption of Homogeneity for ANOVA

time		Levene Statistic	df1	df2	*p*
T0	Based on Median	.50	1	31	.49
T1	Based on Median	.04	1	31	.85
T2	Based on Median	1.80	1	31	.19