Chapter 7 Summary, Conclusions and Discussion

The aim of this thesis was twofold. First, in part I of the thesis we investigated the effectiveness of the Dutch school-based social skills intervention program TRAffic 8-12 on 74 children in Cluster 4 education. The program aims to reduce anger and aggression in 8-12-year-old children. We studied the moderating effect of children’s motivation and intervention group composition on program outcomes. A focus on outcome alone, however, reveals only very little (if anything) about why and how the children’s behavior changed or did not change. Therefore, in part II of this thesis our second aim was to look beyond the program outcomes. We considered three issues that could help explain the results of the TRAffic 8-12 program: 1) the implementation and sustainability of the program by the trainers and the children’s teachers, 2) the children’s motives for behaving aggressively, and 3) the impact of the classroom context on the children’s aggressive behavior.

In section 7.1 we summarize the findings and conclusions of the different studies. The implications of our results for practice and for further research are discussed in section 7.2. In section 7.3 a teacher-focused aggression reduction intervention program that has been developed in reply to the findings of the present thesis is described. The chapter concludes with a final remark in section 7.4.

7.1 Summary of Findings and Conclusions
7.1.1 Part I The Tip of the Iceberg: The Effects of the TRAffic 8-12 Program

In part I of this thesis we considered the effects of the TRAffic 8-12 program. This effect study contributes to the need for more research into the effectiveness of Dutch school-based programs (Junger-Tas, 2002; Van Overveld & Louwe, 2005). Dutch intervention studies lag behind international research, especially with respect to follow-up research. Therefore, children’s behavior was rated not only directly after the program had finished, but also six months and two years later.

We were skeptical about a lasting positive impact of the TRAffic 8-12 program. Inspired by dynamic systems thinking (e.g. Lichtwarck-Aschoff & van Geert, 2004; Steenbeek & van Geert, 2005; Van Geert, 2003), we presented an alternative view of the effectiveness and implementation of an intervention program

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This section can be considered the English summary of the present thesis. A Dutch summary is provided at the end of the thesis.
such as TRAffic 8-12. In a dynamic systems view, the influence of an intervention on children’s aggressive behavior is considered to be a process that is shaped by all the elements of the system (e.g. the child, peers in the classroom, peers in the intervention group, the program trainer, the teacher, and also the school), which mutually influence each other. Contrary to a static approach to behavior, the dynamic systems approach does justice to the complexity of real life in which the development of children’s behavior during an intervention cannot be considered independent of other elements of the child’s system. We wondered whether the impact of a temporary intervention program such as TRAffic 8-12 would outweigh the relatively permanent, and possibly negative, impact of the other, mostly behaviorally disturbed, children in the Cluster 4 education classrooms. We hypothesized that the TRAffic 8-12 program would only show small effects directly after the program had ended and that these effects would disappear in the long term.

The results of the effect study indicated that, according to the children’s teachers and parents, participation in the TRAffic 8-12 program did not result in decreases in children’s aggressive behavior and behavioral problems, neither in the short term nor in the long term. We compared the changes in trained children with the changes in untrained children and we compared the levels of children’s behavior after the program with the levels before the program. In some cases we found significant differences between children’s behavior before and after the program, but the clinical relevance of these differences was (very) small. We also studied whether children with higher IQ’s and children without a psychiatric diagnosis would profit more from the program than children with lower IQ’s and children with a psychiatric diagnosis. Teachers’ and parents’ ratings of children’s behavior did not reveal a relation between these factors and program outcomes. Finally, we found a significant difference in the parents’ ratings of behavioral problems between children who had qualified for transfer to a regular school some time after the program had ended and children who stayed in Cluster 4 education. Although the effect size of the difference between these two groups was the largest of all our results, the effect size was still small. These results did not provide sufficient evidence from which to conclude that there was a clinically relevant difference between the two groups, especially as we took into account the probability of the presence of a positive observer bias (the raters knew that their ratings occurred before and after the program).

An important goal of the effect study was to gain insight into the moderating effect of children’s motivation and intervention group composition on
program outcomes. This search for moderators in our study fits with the current line of intervention research that is less focused on how effective programs are in general and which programs are most effective, and more focused on which programs work best for whom and under what conditions (Kazdin, 2000).

The influence of children’s motivation on program outcomes is hardly discussed in literature (Bijstra & Nienhuis, 2003). Motivation is, however, considered an important common factor (Van Yperen, van der Steege, Addink & Boendermaker, 2010) or moderator (La Greca, Silverman & Lochman, 2009) of treatment effects. We hypothesized that motivated children would profit more from the TRAffic 8-12 program than unmotivated children. The children were assigned to the motivated group if their answers to several interview questions indicated that they wanted to learn more prosocial skills (otherwise the children were assigned to the unmotivated group). Although the results showed that the changes in the motivated and the unmotivated children were in the expected direction (i.e. the motivated children showed more of a decrease in problem behavior after the program than the unmotivated children), the teachers’ and the parents’ ratings of children’s aggressive behavior and behavioral problems indicated that the differences between the two groups were not significant, with very little clinical relevance.

Contrary to motivation, the influence of intervention group composition on program outcomes has been studied fairly extensively. Several studies (e.g. Ang & Hughes, 2001; Arnold & Hughes, 1999; Dishion, McCord & Poulin, 1999) have documented the harmful effects of grouping aggressive adolescents in intervention programs. Other studies (e.g. Ang & Hughes, 2001; Mager, Milich, Harris & Howard, 2005) have documented more ambiguous results. We explored whether iatrogenic effects would occur in groups of aggressive children of elementary school age. The children in our study were trained either in a group of six children or individually. The assumption was that the individually-trained children would benefit more from the TRAffic 8-12 program than the group-trained children, because the individually-trained children would not be negatively influenced by the aggressive behavior of group members. In a similar manner to the results of the motivated and the unmotivated children, the results were in the expected direction (i.e. individually-trained children showed more of a decrease in problem behavior after the program than the group-trained children). However, the teachers’ and the parents’ ratings of children’s aggressive behavior and behavioral problems indicated that, again, the differences between the two groups were not significant.
In Chapter 3 we listed several explanations for the fact that we did not find unambiguous short-term or long-term effects of the TRAffic 8-12 program, and that we did not find differential effects for motivated versus unmotivated children and for individually-trained versus group-trained children. We do not have reason to believe that the TRAffic 8-12 program is a poorly developed program. Theoretically speaking, the program should be effective in reducing aggressive behavior, as the theories on which the training techniques are based have been proven to have scientific value. How, then, did we not find (long-term) effects of the program? The studies that are described in part II of this thesis can be considered a search for answers to this question.

7.1.2 Part II Beyond the Tip of the Iceberg: Considering Program Implementation and Sustainability, Children’s Motives and Impact of Classroom Context

In part II of the thesis we looked beyond the program outcomes (the ‘tip of the iceberg’). We focused on three issues that could help explain the absence of TRAffic 8-12 effects: 1) the implementation of the program, the sustainability of the training techniques and the influence of school contextual processes, 2) the children’s motives for behaving aggressively, and 3) the impact of the classroom context on the children’s aggressive behavior. The choice for these three issues was motivated by an alternative conceptualization of intervention and behavior change. In Chapter 1 we explained that the traditional approach, namely that of intervention as a medical model that cures static problems such as aggressive behavior, is problematic. This approach does not do justice to the complexity of behavior change, which is by nature a process that unfolds in a complex interplay between person (i.e. the child) and context (Lichtwarck-Aschoff & van Geert, 2004). Therefore, we adopted a contextual model of intervention (Wampold & Bhati, 2004) and a dynamic systems approach to behavior change (Lichtwarck-Aschoff & van Geert, 2004).

First, in Chapter 4, we performed a qualitative study of the program trainers’ implementation of the TRAffic 8-12 program and the teachers’ implementation and sustainability of the TRAffic 8-12 training techniques outside and after the program meetings. The quality of program implementation has been proven to have an important impact on program outcomes (Domitrovich & Greenberg, 2000; Durlak & DuPre, 2008). Also, a degree of sustainability is essential in achieving long-term results of intervention programs. Furthermore, we considered the underlying...
processes that occurred in the schools and that affected program implementation and sustainability. We argued that these processes need to be captured because program implementation and sustainability are influenced by interactions within the school context (i.e. children’s teachers, peers in the classroom, available resources) (Cartwright, 2009; Lichtwarck-Aschoff & van Geert, 2004). We introduced the phenomenon of the ‘context-dependency of causality’, explaining that intervention program elements are only effective with, or via, factors external to the intervention program itself.

We registered the implementation and sustainability process by keeping a journal with personal observations and by interviewing the program trainers and the teachers. The study showed that the program trainers’ implementation of the TRAffic 8-12 program was hampered by difficulties in managing the behavior of the children trained in groups and by reduced motivation of the trainers to carry out the program. Several factors in the school context appeared to be responsible for these findings. The children’s behavior in the group sessions proved to be dependent on the presence or active involvement of the children’s teachers, who are an essential part of the child’s natural context. Furthermore, the limited availability of the required resources (time, substitution of teachers, and space) in the school context influenced the program trainers’ motivation to carry out the program. With respect to the sustainability of the TRAffic 8-12 training techniques, the study showed that the teachers were not motivated and not capable enough to implement and sustain the techniques outside and after the program meetings. Instead of the techniques themselves, individual processes within the teacher appeared to play a crucial role. The teachers expected to see immediate improvements in the behavior of the children who participated in the TRAffic 8-12 program, and they were disappointed when this was not the case. In Chapter 4 we discussed how teachers view their own role with respect to the development of children’s behavior at school, and we concluded that several conditions need to be met in order to convince and motivate teachers to invest in children’s social-emotional development. In sum, the results of the implementation and sustainability study all pointed to one conclusion: In Cluster 4 education the children’s teachers are crucial. In the TRAffic 8-12 project, much more effort should have been made to involve teachers in the choice for the program and in the implementation of the program, to support teachers in finding ways to integrate the TRAffic 8-12 training techniques into their existing classroom
practices, and to provide feedback on teachers’ efforts to improve the children’s behavior.

Second, in Chapter 5 we studied the children’s perspective on their own aggressive behavior. We wanted to gain more insight into the children’s motives for behaving aggressively. The children were interviewed with an inner logic interview instrument (Singer, Doornenbal & Okma, 2002). The inner logic of children refers to how they view the situation in which they are acting; what they do in social situations (social actions and emotion regulation); what their goals, concerns and emotions are; how they regulate their emotions and how they view the emotions and concerns of their opponents.

Contrary to the much-used dichotomy of reactive and proactive aggression (Crick & Dodge, 1996; Merk, 2005; Orobio de Castro, 2004), we found a more differentiated picture of five profiles of inner logic. Children reported using aggression to create understanding for their situation, to escape from the conflict situation, because of inner conflicts, for revenge, and for the fun of bullying. These results indicate that children can have different motives for behaving aggressively, requiring different approaches in terms of intervention instead of one general approach such as the TRAffic 8-12 program. A striking example of possible counterproductive effects of the TRAffic 8-12 training techniques is Kevin. He reported using aggression for revenge and to settle the power balance. Kevin did not use the ‘think-time’ of the Stop sign technique to think of alternatives to aggression, but instead used it to build up anger and ‘explode’. This is an example of how there can be a serious mismatch between a child’s motives and the techniques of an intervention program. We suggested that children like Kevin probably need individual support and cannot be helped in group sessions of programs such as TRAffic 8-12.

Third, in Chapter 6 we considered the impact of the children’s classroom context and confronted this impact with the effects of the TRAffic 8-12 program that were studied in Chapter 3. We hypothesized that the children who transferred from special to regular education would show a change towards less aggression. This was hypothesized because of the relatively fewer accounts of negative peer group effects in regular education. We also assumed that the influence of the social skills intervention context on the children’s aggressive behavior would be weaker than the influence of the classroom context. A child spends more time in the classroom than
in the intervention group and the classroom is also a more familiar and structural element of the child’s environment than the intervention context.

As we already concluded in Chapter 3, the social skills intervention program TRAffic 8-12 did not have differential effects for group-trained versus individually-trained children. Also, there were no long-term results of the program for the children who stayed in Cluster 4 education. However, a change toward less aggression was found in children who transferred from special to regular education. Based on these results we discussed the importance of addressing the fit, or misfit, between a child and the contexts in which the child functions (Vermeer, 2007). Attempts toward changing the child’s behavior must therefore not focus on the child alone, as in the case of the TRAffic 8-12 program. Instead, changing the context and explicitly taking into account how certain contexts work for the child must be an essential part of any intervention program that aims to permanently change behavior.

7.2 Discussion of Practical and Research Implications

7.2.1 Implications for School Practice Settings and Intervention Program Development

Because we looked ‘beyond the tip of the iceberg’ in this thesis, we gained essential insights into possible reasons for the absence of TRAffic 8-12 effects. We still believe that the TRAffic 8-12 program can be effective for a subgroup of children with aggressive behavioral problems. To achieve this, our studies showed that several conditions need to be met or must be considered in order to successfully implement a school-based social skills intervention program such as TRAffic 8-12.

First, school practice settings that wish to implement an intervention program need to be made aware of the efforts that are necessary to secure a successful implementation of the program and sustainability of the program elements (Domitrovich & Greenberg, 2000), and they need to be supported in achieving this as well (Han & Weiss, 2005). Schools are not primarily organized to facilitate the implementation of intervention programs. This fact is often overlooked, which results in an implementation of the program that is not optimal and in disappointing results. The institution that releases an intervention program and trains teachers to implement the program should provide a type of ‘support program’. In this support program the following issues should be addressed: 1) Screening of compatibility between the essentials of the program and the problems that the school and the teacher want to target, 2) support and feedback for teachers on how they apply the training techniques and what the effects of their efforts are on the
children’s behavior, and 3) continued support for teachers after the program on how to integrate the training techniques with their existing classroom practices.

Second, individual differences between children should be taken into account in the development of child-focused intervention programs (Nangle, Erdley, Carpenter & Newman, 2002). The study of children’s narratives, for example, showed that children use aggression for different reasons, requiring different approaches. Certain training techniques are not effective for all children. The effective Zippy’s Friends program (see for example Clarke & Barry, 2010; Van den Berg-de Ruiter, Roovers & Panis, 2009), which is focused on teaching children coping skills, is a program that does not teach children exactly how to act in certain (difficult) situations. Instead, children are supported in finding the right coping methods that work for them specifically. This is a good example of the way in which intervention programs can be adapted to individual differences between children.

Third, in the development of school-based programs such as TRAffic 8-12 the influence of the school context in which children operate daily should be considered (Clarke, O’Sullivan & Barry, 2010; Cohen, Hsueh, Russell & Ray, 2006; Farmer & Xie, 2007; Ringelstein, Henderson & Hoagwood, 2003). From the dynamic systems perspective that we adopted in this thesis, we repeatedly stated that children’s behavior is not only the product of certain mechanisms in the child (e.g. lack of social skills, poor emotion regulation), but also the product of a reciprocal interaction between the child and the daily context of the child. So, in school-based intervention programs children’s problematic behavior should not be considered to stand ‘on its own’. Their behavior is, for example, co-determined by the behavior of the (other) children in the classroom (Barth, Dunlap, Dane, Lochman & Wells, 2004; Kellam, Ling, Merisca, Brown & Ialongo, 1998; Thomas, Bierman & The Conduct Problems Prevention Research Group, 2006). Certain children might always react aggressively because other children know exactly how to provoke these children out of the teacher’s sight. Therefore, an intervention program should not just target the problematic behavior of particular children (e.g. focusing on how to control anger), but also the behavior of the other children in the classroom (e.g. focusing on teaching rules about how to interact with each other).

The teaching style of the teacher is another important ‘component’ of the school context that co-determines children’s behavior. In general, teachers who experience difficulties with the behavior of certain children in the classroom look for solutions ‘outside themselves’, for example in the form of a social skills intervention
program. The program is assumed to be the method for solving the problem with the particular children that show problematic behavior. The role of the teacher is thereby overlooked. From the implementation and sustainability study described in Chapter 4 we concluded that children’s teachers are crucial for the achievement of long-term effects in an intervention program. They need ongoing and intensive support to integrate a program’s training techniques into their classroom practices in a sustainable way. The point we want to make here is that, in addition to attention to the integration of particular training techniques in a teacher’s classroom practice, considering the teaching style of the teacher in general also contributes to the improvement of children’s behavior. In school, teachers are the children’s central change agents (Louwe & van Overveld, 2008). Their pedagogical thinking and actions have a big influence on children’s behavior. Louwe and Van Overveld (2008) point to the many television programs about child-rearing problems in families that show the importance of educators’ pedagogical thinking and acting when influencing children’s behavior. In school, teachers are crucial in teaching children how to interact with each other, for example by behaving as a role model or by setting rules and ensuring that children keep to these rules in a consequent manner with the use of a well-thought-out reward system. This seems to be stating the obvious, but the set-up of most social skills intervention programs fails to underline the role of the teachers (Louwe & van Overveld, 2008). Instead, the focus is on teaching children new skills. In reply to the findings of the studies presented in this thesis, we developed a teacher-focused, web-based program that is aimed at providing teachers with tools to improve children’s problematic behavior via their own pedagogical action repertoire. In section 7.3 this program is described.

Finally, we would like to stress the importance of more attention for the socio-emotional development of children in schools. Elias, Zins, Gracyzk and Weissberg (2003) point to the fact that “the focus of schools on test scores in reading and math has clouded an understanding of the interrelationship between academic and social-emotional learning”. Schools are primarily focused on the academic development of children (Massey, Armstrong, Boroughs, Henson & McCash, 2005). There are several arguments that plea for a stronger focus on children’s socio-emotional development as well. Teaching children socio-emotional skills and improving their well-being is as important as teaching academic skills, because both skills are needed for being successful in life. As Elias, Zins, Gracyzk and Weissburg (2003) state: “There is a growing international recognition that
education must …… refocus to prepare children for the tests of life, not for a life of tests”. Also, academic skills and socio-emotional skills are intertwined. Children’s academic performance in school is dependent on their socio-emotional well-being and vice versa (Elias, Zins, Graczyk & Weissburg, 2003). This intertwining of ‘components’ (i.e. skills, capabilities, development areas) within a child’s system is typical for the dynamic systems approach (see for example Van Geert, 1998). In this approach, the relationship between a system’s components is described as either supportive (growth in one component supports growth in another one), competitive (growth in one component is related to decline in another one), or neutral. In this case, the relationship between children’s academic performance and their socio-emotional skills can be described as mutually supportive. Thus, children’s academic performance will benefit from investments in their socio-emotional development (and vice versa). Wilson, Gottfredson and Najaka’s (2001) meta-analysis of the effects of school-based intervention programs supports this notion: The programs that focused on socio-emotional learning resulted in improved outcomes of factors related to school success. Finally, the recent developments in the Netherlands towards more inclusive education for children with disabilities ask for higher investments in preparing teachers in regular education to cope with these children. Regular school teachers perceive the children with behavioral and psychiatric problems as the hardest group to deal with.

7.2.2 Implications for Research

In effectiveness research the dominant method is the Randomized Controlled Trial (RCT). It is a quantitative method in which large groups of children who receive a particular treatment are compared with a control group of children who do not receive the treatment. Simply stated, if the treatment group shows an improvement in the targeted behavior and the control group does not, then the treatment program receives the label ‘evidence-based’. The label implies that the program works; it ‘cures’ the problem that is targeted. This type of research is also called ‘evidence-based practice’ (Van Yperen, 2005). Politicians, organisations that subsidize intervention research, intervention researchers and clinicians are all ‘on the hunt’ for evidence-based intervention programs.

A problem with the evidence-based approach is that very large samples are needed in order to make sound conclusions about the effects of the intervention. Only large samples can outweigh the variability within the sample. In most evidence-
based studies the researcher does not have such large samples. Furthermore, the
evidence-based approach reveals little about how an intervention program works in
different practice settings and for individual children (see, for example, Cartwright
2009; 2010). Contrary to the quantitative and evidence-based practice approach is a
more qualitative and practice-based evidence approach, which allows for the
complexity of developmental phenomena such as (changes in) children’s behavior
(Granic & Hollenstein, 2003). In the latter approach, for example, mechanisms of
change in small groups of children who participate in an intervention program are
monitored closely and extensively by using observation or interviews, or program
trainers keep diaries of the treatment process. This type of research method is typical
for the dynamic systems approach. It gives essential insights into change processes,
and it can provide answers to the often differential effects of intervention programs.
Our studies of the implementation and sustainability of the TRAffic 8-12 program
and of the children’s narratives of aggressive behavior are examples of that approach.

In sum, we believe that the value of RCT’s needs more nuance. Understandably, certain
groups, such as policy makers, need to know whether a certain program is beneficial for a large group of children in order to make their policies. However, RCT’s do not give insight into how and why intervention programs work for whom, and under what circumstances. Therefore, more qualitative reports are also needed.

The quantitative - evidence-based practice versus qualitative - practice-based
evidence dichotomy derives from a static versus a dynamic approach of behavior
(change) (Lichtwarck-Aschoff, 2008). Evidence-based practice with its quantitative
methods implies a static approach, as the outcome variable (i.e. aggressive behavior)
is associated with the independent variable (i.e. the aggression reduction intervention
program). If we want to capture the nature of the change processes that occur as the
result of the implementation of an intervention program, then we need to adopt a
dynamic approach (Granic & Hollenstein, 2003). This approach allows us to study
how, in time (e.g. during an aggression reduction program), the state of a system (e.g.
a child with high levels of aggressive behavior) evolves to another state (e.g. a child
with lower levels of aggressive behavior). This approach gives insight into the
mechanisms that account for change in individual children who participate in
intervention programs.

A growing number of researchers in developmental and clinical psychology
have started to adopt the dynamic systems approach (see, for example, Carriere,
of (childhood) aggression research, dynamic systems methods have been applied to studies of antisocial development in children and the role of coercion (Granic & Patterson, 2006), the joint influence of children’s impulsivity and relationships with peers on growth in behavioral problems (Snyder, Prichard, Schrepferman, Patrick & Stoolmiller, 2004), the influence of friendship on antisocial behavior from childhood into adulthood (Dishion, Nelson, Winter & Bullock, 2004), and the relationship between rigidity and development of problem behavior (Hollenstein, Granic, Stoolmiller & Snyder, 2004). Dynamic systems methods are also increasingly being applied in the field of intervention research, for example in studies of change in cognitive therapy for depression (Hayes & Strauss, 1998), clinical case formulation (Schiepek, 2003), and how parent-child interaction changes with intervention (Granic, O’Hara, Pepler & Lewis, 2007). In the present research project we also began building a dynamic model. In section 7.2.3 a preview of the preliminary work that has been done so far on building a dynamic model of aggressive interaction between two elementary school children is presented.

Finally, another and well-discussed dichotomy in the field of intervention research is the debate on specific factors (i.e. the medical model) versus common factors (i.e. the contextual model) (Van Yperen, van der Steege, Addink & Boendermaker, 2010). From the dynamic systems perspective this distinction does not seem very useful, for both the specific training techniques and common factors such as the relationship between the trainer and the child are considered part of the intervention system and cannot be considered separately. For example, the training technique of the Stop-Think-Do method may only become effective for a child if the teacher is able to explain the method to the child in a correct and adaptive (to the child’s developmental level and the child’s perception) way and if the teacher supports the child in using the method in real life situations.

Until now, many researchers and practitioners believed that only the specific factors of an intervention program (i.e. the particular training techniques, the contents of the program) lead to changes. A growing body of evidence (e.g. Duncan, Miller, Wampold & Hubble, 2009; Wampold, Ahn & Coleman, 2001)
shows that more common factors, such as the personality of the therapist and the relationship between the therapist and the client, also determine the outcomes of an intervention program. The results of the studies described in part II of this thesis support the theory of the presence of common factors that co-determine the outcomes of the TRAffic 8-12 program. The implementation study showed that for the children in Cluster 4 education the presence or active involvement of their teachers was very important for a successful implementation of the program. This finding corresponds with the significance that is ascribed to the person of the therapist in the contextual model (Wampold, Ahn & Coleman, 2001). The study of children’s inner logic showed that children have different motives underlying their aggressive behavior. Although we did not test whether different motives of children resulted in different outcomes of the program, one can imagine that children who like to bully other children might benefit less from the TRAffic 8-12 program (as they have less motivation to change) than children who use aggression to defend themselves, but feel guilty about it. Again, the findings from this study correspond with a common factor in the contextual model, namely the fit between the rationale of the treatment and the problems that the client experiences.

In the Netherlands, the issue of the importance of the specific versus the common factors is hotly debated. However, based on a dynamic systems approach to intervention and on the growing body of evidence that both specific and common factors are relevant to intervention outcomes, it must be concluded that both factors are important (Van Yperen, van der Steege, Addink & Boendermaker, 2010). In the Netherlands most practitioners and intervention researchers still focus too much on the (effects of the) specific intervention program that is meant to solve the problem. What is needed is a better understanding in practice settings of the interplay between both the common and the specific factors of an intervention program.

7.2.3 Dynamic Modeling as a Research Tool: A Dynamic Model of Aggressive Interaction

In this section we present our first steps in building a dynamic model of aggressive interaction between two children. With the model we aim to provide insight into how the (aggressive) behavior of a child unfolds in real time, step by step, in interaction with other elements in the system such as peers or adults. Knowledge of the mechanisms of real time development of aggressive behavior in children can make a significant contribution to the development of aggression
A dynamic systems model is defined as a set of interacting elements (e.g. two children and their context, each with particular characteristics) that influence each other mutually over time. The state of a system at one moment in time is determined by the characteristics of those elements (i.e. the values of certain variables). The state of the system at a next moment in time is a function of (the elements of) the system in the previous moment. The first step in building a dynamic model is to describe the process in the form of a conceptual model. This means that the relevant variables of that process and how they influence each other mutually must be determined. The next step consists of translating the conceptual model into a mathematical model that is able to produce an output (i.e. types of change processes or trajectories) that corresponds with the theory of the conceptual model. Finally, the conceptual model must be empirically tested.

The development of aggressive behavior in children can be modeled in different ways, depending on the particular phenomenon that is to be studied. A developmental phenomenon can, for example, be modeled across different time scales, varying from years, to months, to days, to seconds (Lichtwarck-Aschoff, 2008). At the so-called macro level long-term developmental changes and trajectories are modeled, while at the micro level short-term actions and interactions are modeled. Obviously, the two time levels are related, meaning that changes in, for example, short-term interactions between a child and its environment will result in changes in the long-term development of the child. Thus, in a fully developed dynamic model the two time levels are related to each other. In our model we first focus on how the (aggressive) behavior of two children unfolds during a short-term interaction, with the intention of modeling how an aggressive interaction starts, unfolds, and finally how the aggressive interaction stops. For that purpose, we chose to use an agent model that models the interactions between real agents (i.e. people) and their environment (Steenbeek, 2006). In our model the agents are two children and the environment is the school context consisting of the children’s classmates, the teacher, et cetera. These are the elements of the dynamic system. Changes in the system are the result of interactions between relevant characteristics of the two children and their school context. These characteristics (which include, for example, the degree of impulsivity of the children or the degree of aggression in the environment) form the variables of the dynamic system. Dependent on the values of
those variables, the system is in a certain (stable) state. Aggression develops through spontaneous interactions between the system’s elements.

In Figure 1 we display how the behavior of two interacting children and their school context influence each other mutually in two time steps. The behavior of child 1 at time \( t \) influences the behavior of child 2 at time \( t \) and vice versa. Both children’s behavior at time \( t \) is also influenced by the school context at time \( t \), and they influence the school context as well through their behavior. At time \( t+1 \) the behavior of child 1 and child 2 is influenced by their own behavior at time \( t \), by the behavior of the other child at time \( t \) and by the school context at time \( t \). The school context at time \( t+1 \) is also influenced by both the school context, the behavior of child 1 and the behavior of child 2 at time \( t \).

![Figure 1. Diagram of an agent model with two time steps.](image)

On the basis of existing theories on aggressive behavior in children and our own empirical findings, we began the conceptualization of our dynamic model. We chose the variables that seemed most relevant to the phenomenon we wanted to model (i.e. the beginning, the course and the end of an aggressive interaction between two children in the school context), and we began by determining how these variables interact with each other.

With respect to the child’s behavior we chose the following variables. First, each child has a certain behavioral repertoire that is formed by previous experiences (for
example, aggression produces positive results), family influences (e.g. deviant parenting), and the number of aggressive role models. This is the behavioral part that is determined by social-learning mechanisms (Bandura, 1978). The chance that a child will (re)act aggressively towards another child during an interaction is higher if the child possesses a highly aggressive behavioral repertoire, consisting mostly of aggressive strategies and almost no prosocial strategies, than if the child possesses a behavioral repertoire with mostly prosocial strategies.

Second, each child has a certain level of impulsivity. Impulsivity has been proven to be related to aggression, in particular to reactive aggression (Dodge, Lochman, Harnish, Bates & Petitt, 1997). Children who are highly impulsive will be quicker with an aggressive (re)action than children who are low in impulsivity.

Third, children’s aggressive behavior is determined by the way that they regulate their emotions. Children who are less skilled in regulating their emotions show more reactive aggressive behavior (Little, Jones, Henrich & Hawley, 2003). Additionally, children with a strong temperament and children who are easily frustrated show more aggression (Berkowitz, 1989; Crick & Dodge, 1996).

Fourth, the child’s perception of the situation determines the aggressiveness of the (re)action of the child. Children differ with respect to when they interpret the behavior of the other child as a trigger to aggress. Some children, such as those with distorted cognitions (e.g. the hostile attribution bias; Crick & Dodge, 1996), easily interpret the behavior of others as a trigger to aggress, which makes them negatively biased with respect to their reaction. They react with more aggression to the behavior initiative of another child than children with a ‘correct’ perception of the situation. Other children, such as those with a disorder on the autism spectrum, might interpret an aggressive behavior initiative of another child as less aggressive than it actually is, which makes them positively biased in their reaction.

Finally, children’s concerns are important drivers of behavior (Frijda, 1986; Visser, Singer, van Geert & Kunnen, 2009). Children have different personal and social concerns or motivations underlying their behavior. A child who wants to avoid conflicts reacts with less aggression to an aggressive behavior initiative of another child (positive bias) than a child who wants to dominate the other child, making him or her react with more aggression (negative bias). Children’s concerns are determined by previous experiences, but they are also dependent on the specific context (in this case the school context) the child is in. In an interaction a child evaluates what his or
her reaction will mean with respect to the balance between ‘gain’\(^{33}\) and ‘loss’\(^{34}\) in the specific context. For example, in a classroom a child will have less motivation to aggress because, contrary to a situation on the playground, there is also a greater risk to be caught and be punished by the teacher (i.e. there is more loss than gain). Another example might be that a child perceives the behavior initiative of the other child as aggressive, but because the child is afraid of the other child (i.e. there is more loss than gain) the child decides, in this particular situation with this particular child, in favor of an appeasement strategy (i.e. reaction with a positive bias).

Above we listed the variables within the child that, at time \(t\), determine the probability that both child 1 and child 2\(^{35}\) will show an aggressive action. Factors in the school context also influence this probability. First, many (aggression provoking) cues in the context result in higher chances of aggression. The number of cues in general influences the arousal of a child – the more cues, the higher the arousal, and the sooner a child will (re)act aggressively (Zillman, 1988; 1994). Video observations that were made of one classroom of boys who participated in the studies of this thesis\(^{36}\) confirm this notion. In school situations with a limited number of cues (e.g. doing work in the classroom) there were considerably fewer aggressive interactions compared to situations with many cues (e.g. free play time on the playground). Not just the number of cues in general, but also the type of cue influences the chance of aggression. In Chapter 6 of this thesis we showed that contexts high in aggression (i.e. many classmates who show aggressive behavior) have a potentially negative influence on the behavior of individual children (i.e. more aggressive behavior).

Second, the children’s teacher is an important variable in the school context that influences the aggressive behavior of the children. Some teachers tolerate more disturbing behavior than others. Also, some teachers are less attentive than others with respect to how children interact with each other. In children with these types of teachers the chance of aggressive (re)actions is higher. The influence of the teacher also depends on the specific school situation. In a classroom the teacher has more opportunity to control children’s behavior than on the playground, where children have more freedom and where there is a higher chance of them being out of the teacher’s sight.

\(^{33}\) Gain: if the child reaches its goal, which can be variable (domination, fun, revenge, escape).
\(^{34}\) Loss: if the child gets further away of reaching its goal.
\(^{35}\) From the diagram in Figure 1.
\(^{36}\) These observations are not presented in the thesis.
The variables listed above form so-called parameters; they are adjustable, dependent on the type of interaction you want to model (i.e. the type of children and the type of context). The model will start with an interaction initiative of one child, determined by the factors within the child (the child variables), the behavior of the other child, and the specific school context at that moment, and applies only to the first behavior of an interaction series. It represents, for example, a child who: 1) hits another child on the head while passing the child in the classroom, or 2) kicks another child on the playground, or 3) asks another child to play with him, or 4) pulls a child to the playground to encourage him to play along.

The course of the interaction between the two children is determined as follows. The basic property of the reaction is that it is, in principle, symmetrical (e.g. you hit me – I hit you; you hit me hard – I hit you hard) (Cairns, Santoyo & Holly, 1994; Chermack, Berman & Taylor, 1997). Individuals can differ in terms of biased symmetry, with a positive bias (you hit me hard – I hit you less hard) or a negative bias (e.g. you hit me hard – I hit you harder). The first bias leads to appeasement, and the second leads to escalation (in principle). Thus, there are three possibilities with respect to the reaction of one child to the behavior initiative of the other child: A ‘correct’ reaction (the reaction is of the same kind/intensity/form), a positively biased reaction (the reaction is less aggressive), and a negatively biased reaction (the reaction is more strongly aggressive). Whether or not the reaction is biased depends on the factors within the reacting child (the child variables) and on the school context. For example, with a child with an aggressive behavioral repertoire and who is easily frustrated there is a high chance of a negatively biased reaction to a neutral tap on the shoulder from another child while playing soccer on the playground.

The end of the interaction between the two children is determined in two ways. First, as we observed in our videos, in many cases the aggressive interaction simply stops, after, for example, five (re)actions between the two children. It seems that there is some sort of saturation within (one of) the children, probably driven by the fact that their concerns are secured. Second, the teacher might interfere and stop the aggressive interaction. The probability of interference of the teacher is determined by parameters representing the teacher’s personality traits (aggression toleration and attentiveness), the specific school situation (i.e. in the classroom the probability of a teacher’s interference is higher than on the playground) and the duration of the interaction of the two children (the longer the interaction, the higher the probability that the teacher notices the children and interferes).
In this section we have presented a preview of the development of our dynamic model of aggressive interaction between two children in a school context. With this model we aim to determine which mechanisms account for the occurrence, course and the end of aggressive interactions. Dynamic modeling gives us the opportunity to test our assumptions about the interplay between the child and the school context in the development of aggressive behavior (e.g. the interplay between children’s concerns and the specific situation). With the conceptual model (that still needs further development) we have only described the process. With a mathematical model we must be able to generate a plausible output, given the input of the model. This will be a first, internal validation of the model. After that, the model must be validated externally by comparing the output of the model simulations with empirical data.

7.3 A Teacher-Focused Aggression Reduction Program: Grip op Gedrag

7.3.1 Motivation for Development of the Program

The findings of the present thesis inspired us to develop a new type of aggression reduction intervention program, called Grip op Gedrag (Grip on Behavior). The program is focused on strengthening the teacher’s skills in dealing with children’s behavioral problems at school. The program’s training techniques are based on general principles of basic communication and they are derived from existing aggression reduction intervention programs. This means that the techniques themselves are not new. In our opinion, many potentially effective methods and techniques have been developed in recent years. They are embedded in accepted developmental theories. Given this theoretical and empirical support, the techniques should be effective in reducing children’s behavioral problems. However, as we concluded in the present thesis, a review of all the school-based intervention programs reveals highly ambiguous results.

The results of the studies in this thesis give insight into what is needed to accomplish positive results with existing training techniques. An important aspect is that we need to focus more on elements of the interaction between child and context, instead of on children’s skills alone. All children’s behavior is provoked and maintained by interactions between the child and the environment (see, for example, Fogel, 1993; Sameroff & Chandler, 1975; Van Geert, 1998). In Figure 2 we present

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37 The development of the program is made possible with a grant from ZonMw.
our analysis of the problems with existing aggression reduction programs together with the assumptions that meet these problems and that form the basis for the development of the new program. We believe that if we implement existing training techniques that have been proven to be effective in such a way that they match with the specific child, teacher and context, they will be more effective than they are now.

7.3.2 Development and Contents of the Program

The program Grip op Gedrag has been developed by the University of Groningen and the University of Applied Sciences Inholland, in co-operation with an education support centre in Groningen (ABCG) and five teachers from three different elementary schools. It is a web-based program, which means that it will be (freely) available on the internet (via the web server of the University of Groningen) as soon as the development of the program is finished completely. We developed the basics of the program with the five teachers. Key elements of the program are the expansion of teachers’ action repertoire, a focus on solutions, goal-orientation, and inclusion of children’s motivations.

<table>
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<tr>
<th>Problems in existing programs</th>
<th>Assumptions for the new program</th>
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<tr>
<td>1. A homogeneous approach does not match with differences between children in behavior, cognitions, and concerns.</td>
<td>1. The program must provide a tailor-made solution for children’s problems that meets their concerns.</td>
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<tr>
<td>2. Specific techniques are only effective for particular children in particular situations.</td>
<td>2. The techniques must fit with the specific problems of the children.</td>
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<td>3. Children’s motives and concerns have a great influence on their problematic behavior, but they are overlooked in the development of intervention programs.</td>
<td>3. Children’s concerns must be taken into account.</td>
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<td>4. There is no transfer of learned skills to daily situations.</td>
<td>4. The program must be appropriate for direct application in the classroom.</td>
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<tr>
<td>5. Problems with program implementation in schools can lead to reduced motivation with the program implementers.</td>
<td>5. The application of the program should be based on the specific goals of the teachers.</td>
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<tr>
<td>6. Programs are solely focused on changing children’s behavior, while the school environment as a whole must be taken into account.</td>
<td>6. The program must not just focus on the child, but also on elements in the school environment that contribute to the problematic behavior of the children (e.g. other children, non-effective teaching procedures).</td>
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*Figure 2. Analysis of problems with existing aggression reduction programs and assumptions for the development of the new program.*
The program consists of interview questions and observation methods for the teacher that clarify the problem, the goals, the needs and concerns of both teacher and child(ren), and the possibilities concerning working on the problem. Based on the information that the teachers fill in on the website forms, advice follows for the teacher focused on improving the behavior of the child. Directions with respect to implementation of the techniques in the classroom are also provided. Additionally, in the program teachers are asked to monitor the behavior of the child(ren) in order to be able to examine whether the advice is effective in improving the child(ren)’s behavior. Finally, the teacher completes an evaluation.

As we said before, the contents of the advice that the program produces is not new. It is based on existing techniques, used in intervention programs or methods that have been proven (partly) effective. The program is novel in the sense that it provides instructions for the teacher on how to implement the techniques in daily situations and with different children. The advice consists of a general section in which the teacher is provided with very concrete techniques to improve his or her general interaction, didactic and classroom management skills (e.g. being sensitive and responsive, focusing on desired behavior, being supportive, providing structure). Teachers who possess these skills are able to provide a safe classroom environment, which is important for the academic and socio-emotional development of all children at school. For children with behavioral problems such an environment can be considered an essential and basic condition needed for them to function in a classroom. The techniques are derived from methods such as Video Home Training, which is focused on parents’ basic communication skills and strengths that already exist in the family.

The advice in the program also consists of a specific section that matches with the goal that the teacher has formulated in the program. This means that the program is primarily focused on the teacher’s goal with respect to improving the behavior of a child. This makes the program distinguishable from other aggression reduction intervention programs that mainly focus on changing children’s behavior without considering the teacher’s role. The techniques in this section of the advice are based on methods frequently used in existing intervention programs aimed at improving children’s behavior (e.g. Zelfcontrole, Equip, Minder boos en opstandig, Programma Alternatieve Denkstrategieen, Taakspel, Leefstijl\textsuperscript{38}). Examples of the techniques

\textsuperscript{38} Most of these programs are described shortly in Chapter 1, section 1.3.3.
are: Modelling positive behavior, reinforcement of desired behavior and the Stop-
Think-Do method for the control of impulsive behavior. These methods have been
proven effective for subgroups of children, under the condition that they are
optimally implemented. Again, the program provides concrete advice on how to
implement the techniques with specific children. Additionally, the effective No
Blame method, focused on reducing bullying behavior, is included in the program.

7.3.3 First Results of the Program

The five teachers who co-developed the program also implemented the core
elements of the program with one or more children in their classroom. We evaluated
the first version of the program with them.

Most teachers thought that there was a good fit between the problems they
experienced with one or more of the children and the advice given by the program.
In most cases the implementation of the advice resulted in a reduction of the
children's behavioral problems. The focus on strengthening the teacher's pedagogical
action repertoire instead of the children's skills was evaluated positively. The
following elements were mentioned by the teachers as being most effective: A
positive approach to the children's behavior, focus on the children’s desired
behavior, being consequent in applying the rules and active involvement of children
in the solution of the problem. All teachers indicated that they were already familiar
with the techniques of the program, but that the systematic way in which the advice
was described and the fit between the problems and the advice was a surplus.
Additionally, they were better able to implement the techniques of this program in a
sustainable way in their classrooms than the techniques of intervention programs
that they had implemented before. According to the teachers, the fact that the
techniques of the Grip op Gedrag program were described in such a way that they
were easily and directly applicable in the classroom played a role in this. Finally, the
teachers evaluated the positive formulation of goals (i.e. directed at the behavior that
is wanted) as very useful. It made them aware of the impact that their ‘mindset’
(focus on the positive versus focus on the negative) has on the children's behavior.

The implementation of the program with the five teachers revealed two
preconditions for implementation success. First, the support of an internal
supervisor of the school is considered very important. Such a colleague can function
as a sound board, give feedback, make observations, and motivate the teacher.
Second, the teacher has to believe in the rationale of the program, namely that the
teacher can have a positive impact on the children’s behavior by reconsidering his or her pedagogical action repertoire.

7.4 Final Remark

The research project that forms the basis of this thesis started off as an intervention study with a classical approach. Our aim was to improve the understanding of the effectiveness of the social skills intervention program TRAffic 8-12. The effect study showed that the program was not effective in reducing the aggressive behavior and behavioral problems of the participating children. This finding has led us to broaden our look and to focus not only on the program itself. Three different studies have shown the importance of the context in which a program is implemented and in which children operate daily, and of children’s concerns that play a crucial role in the behavior that we want to change in intervention programs. The findings from these studies provided us with some important implications with respect to future intervention program implementation and development. Additionally, our look ‘beyond the tip of the iceberg’, which comes down to a more qualitative and system-oriented approach, showed the need for more extensive research designs than the RCT’s that are currently the dominant research method in effectiveness research. Finally, we used the knowledge gathered in this research project to develop a new aggression reduction program, in which the teacher has a central role as ‘change agent’ of children’s problematic behavior.