

## University of Groningen

### I see, I see what you don't see

Kellij, Sanne

DOI:  
[10.33612/diss.652239892](https://doi.org/10.33612/diss.652239892)

**IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.**

*Document Version*  
Publisher's PDF, also known as Version of record

*Publication date:*  
2023

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*  
Kellij, S. (2023). *I see, I see what you don't see: neural and behavioral social-cognitive processes underlying (persistent) victimization*. [Thesis fully internal (DIV), University of Groningen]. University of Groningen. <https://doi.org/10.33612/diss.652239892>

#### Copyright

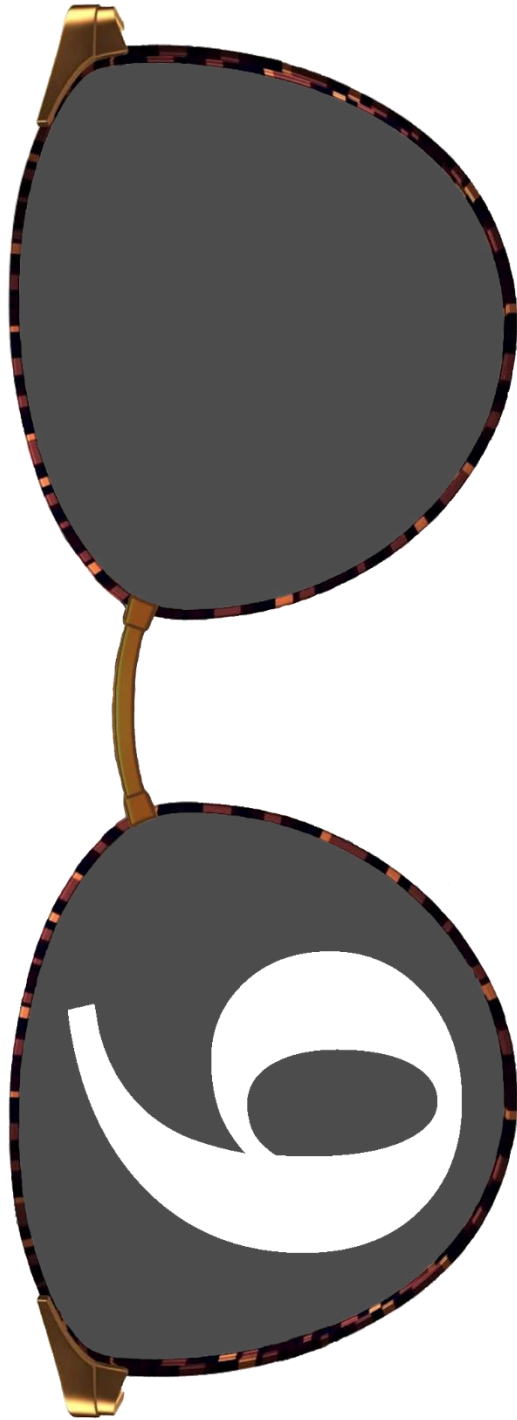
Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

#### Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.



# **Chapter 6**

## **General conclusions and discussion**

## Overview

Social skills contribute greatly to successful social and professional lives. School is a great place to build social skills, yet full of complex social situations where everyone might interpret specific situations slightly differently. Victims appear to have weaker social skills (da Silva et al., 2018; Fox & Boulton, 2005), thus a better understanding of the processing of social situations, so-called social cognition, was needed. Although research on victimization in relation to social cognition has increased over recent years, a clear and integrative overview was lacking. Without a clear view, gaps and inconsistencies remain hidden, obstructing scientific progress. Therefore, in this dissertation, I started with a systematic review of victimization and social cognition (**Chapter 2**), with findings classified in the Social Information Processing (SIP) framework (Crick & Dodge, 1994). Based on the findings of this review, I further explored gaps in the social cognition–victimization literature, examining duration of victimization in relation to emotion processing (**Chapter 3**), rejection sensitivity (**Chapter 4**), and responses to social exclusion experiences (**Chapter 5**), as well as how victimization experiences relate to the underlying neural processes of emotion processing (**Chapter 3**) and social exclusion (**Chapter 5**). These chapters contributed to the overarching aim of this dissertation: Examining the underlying neural and social cognitive processes of persistent victimization.

### Studies in the dissertation

**Chapter 2** provided an overview of research on the encoding and interpretation phases of the SIP model as well as skills to understand others in relation to victimization. The Newcastle Ottawa Scale (NOS) for medical case-control and cohort studies (Wells et al., 2000) was updated to more adequately assess the quality of research in the social sciences. The updated NOS contained three categories including different characteristics that could receive stars for study quality: 1) Selection, with representativeness of sample (1 star), appropriateness sample size (2 stars), comparability and response rate of non-respondents (2 stars) and provided descriptives of participants (1 star), 2) Measures, with validation of dependent variable measure (2 stars), validation of independent variable measure (2 stars) and inclusion of relevant control variables (1 star), and 3) Analytical design, with longitudinal design (1 star), pre-registration (1 star), descriptives of independent and dependent variables (1 star) and appropriate statistics provided (2 stars). A maximum of 16 stars was attainable for study quality. A third of the articles (31.4%) had 10 or more stars. The results of the 142 included articles were interpreted in light of three hypotheses: First, the *reaffiliation* hypothesis predicted that victims would focus more on positive social cues to restore the social situation. Second, the *prevention* hypothesis predicted that victims would focus more on negative social cues to prevent further escalation. Last, the *desensitization* hypothesis predicted that victims would become increasingly insensitive to social cues because of a numbing effect. Most evidence in the review supported the *prevention* hypothesis, although longitudinal research and studies on the encoding SIP phase were heavily unrepresented.

Based on the outcomes of the literature review the other studies in this dissertation were designed. Given the lack of literature on social cognition and the duration of victimization, all empirical studies in this dissertation included a longitudinal aspect. To give the reader an

indication of the quality of my dissertation, I have assessed Chapters 3-5 with the updated NOS (see Table 1).

**Table 1.** Quality assessment of the Chapters on the updated Newcastle Ottawa Scale (NOS).

|           | Selection | Measures | Analytical Design | Total | Ways to improve    |
|-----------|-----------|----------|-------------------|-------|--------------------|
| Chapter 3 | ★★★☆☆☆    | ★★★★☆    | ★★★★☆             | 10/16 | S1; S2; S3; M1; A1 |
| Chapter 4 | ★★★★☆☆    | ★★★★☆    | ★★★★★             | 12/16 | S1; S3; M2         |
| Chapter 5 | ★★★☆☆☆    | ★★★★☆    | ★★★★☆             | 10/16 | S1; S2; S3; M2; A1 |

*Note.* The update of this scale is available in the supplements of the scientific publication of Chapter 2. Ways that would have improved the quality per Chapter: S1 = Increase the sample size based on the analytical methods (2 stars); S2 = Provide information on how many were approached and how many declined participation (1 star); S3 = Comparison of characteristics of non-respondents and respondents (1 star); M1 = Use validated task(s) (1 star); M2 = Include relevant control variable(s) (1 star); A1 = Make use of longitudinal designs (1 star).

Emotions are prime cues to interpret others' mental states as well as the social situation. If certain emotions capture attention more often and faster than other types of emotions (e.g., positive vs. negative emotions), this is likely to influence how social situations are interpreted. In **Chapter 3** the emotional dot-probe task provided information on whether specific emotions of unknown peers captured implicit attention (happy, angry, afraid), whereas the fMRI emotion processing task provided information on whether specific emotions of unknown peers are differentially processed in the brain (happy, angry, afraid, sad, neutral). Therefore, the aim of Chapter 3 was to examine whether persistent victimization related to differential implicit emotion processing (encoding SIP phase), examined through both behavioral and neural aspects for a comprehensive perspective. This Chapter received 10 out of 16 stars on the updated NOS and could be improved by justifying and increasing the sample size (2 stars), increasing response rates and providing comparisons with non-respondents (2 stars), utilizing a longitudinal design on all variables (1 star) and utilizing a validated task for implicit processing of emotions (1 star).

In **Chapter 4** I zoomed in on the general finding that victims are more rejection sensitive than their non-victimized peers (Gao et al., 2021) and examined longitudinal associations with victimization. Two datasets were used, one at the start of Dutch secondary education and one at the end of Australian elementary education. Both datasets had semi-annual self-reported measurements of rejection sensitivity and victimization (1-1.5 years). Novel in this Chapter was the disentangling of between-subjects and within-subjects effects, to examine whether there were within-subjects (concurrent and cross-lagged) effects between the constructs over and above between-subjects effects. Therefore, the aim of Chapter 4 was to examine

## Chapter 6

whether negative cycles are at play for victimization and rejection sensitivity (interpretation SIP phase). This Chapter received 12 out of 16 stars on the updated NOS and could be improved by justifying and increasing the sample size (2 stars), providing comparisons with non-respondents (1 star) and including relevant control variables (1 star).

In addition to the longitudinal interplay, I also wanted to examine in real-time how victimized children process and respond to social exclusion. In **Chapter 5** I utilized the Cyberball task, an online ball-tossing game that participants played in the MRI scanner during the SCARS data collection. Participants played this game with two others. Whenever the participants received the ball in the game, they could choose whom to throw it next to, either the player on the left or right. They played the game twice; the first game was pre-programmed as social inclusion and the second game as social exclusion. This way I could examine changes in behavior, neural activity and interpretation from inclusion to exclusion. The aim of Chapter 5 was to examine how persistent victimization relates to social exclusion (behavioral SIP phases), both through behavior (mood, need satisfaction and intention to punish) as well as through neural activity and interpretation of the situation (inclusion perception). This Chapter received 10 out of 16 stars on the updated NOS and could be improved by justifying and increasing the sample size (2 stars), increasing response rates and providing a comparison with non-respondents (2 stars), utilizing a longitudinal design on all variables (1 star) and including relevant control variables (1 star).

In this final Chapter, I summarize and discuss the findings of the studies in this dissertation within the SIP framework. First, the main findings of the studies are summarized and integrated. Next, scientific and practical implications are discussed, followed up by future research directions. Last, a conclusion is given to highlight the outcomes of this dissertation.

## Main findings

The studies in this dissertation aimed to examine one or more phases of the SIP model and the main findings in this discussion have been organized within the structure of this model (see the Social Cognition paragraph of Chapter 1 for the SIP model). Furthermore, results were interpreted in light of the *reaffiliation*, the *prevention* and the *desensitization* hypotheses, which were formulated in Chapter 2.

### Encoding

In the first phase of the SIP model, that is, in the encoding phase, individuals attend to, register and classify cues in a social situation. The encoding phase was examined in Chapters 2 and 3. Based on the results of the literature review presented in **Chapter 2** I concluded that little research had been done on the encoding phase in relation to peer victimization, in particular in relation to the selection of and attention to social cues. Victims report more often than their peers that they notice bullying events in real life (Jenkins & Nickerson, 2017). Furthermore, they spend most time looking at bullies and second most at victims during video recordings of peer interactions (Troop-Gordon, Gordon, et al., 2019). However, victims themselves do not report focusing differently on others' emotions (Hussein, 2013). Attention to social cues can also be subconscious, as shown by a study using the implicit Stroop paradigm to measure interference

of victimization-related words where victims responded faster toward victimization-related words (Rosen et al., 2007).

To further pursue the line of implicit attention research, in **Chapter 3**, implicit attention toward emotions of (unknown) peers was examined in relation to persistent and concurrent victimization. Using an emotional dot-probe paradigm with angry, happy, and afraid facial expressions of unknown peers, I found that persistent victimization did not significantly relate to attention toward the emotions of others (happy, angry, afraid). Moreover, I found that the neural processing of emotions of others (neutral, happy, angry, afraid, sad) did not significantly relate to victimization experiences. Importantly, the stimuli only included the facial expression, as the models were wearing black hats and t-shirts and the background was black as well. Therefore, the emotional stimuli used here were lacking social context: in both experiments, the participant's task was not related to the emotional expression, hence measuring implicit attention to the emotions of others. Although the findings of Chapter 3 need replication, they indicated that mere emotional expressions of others do not differently attract implicit attention from victims of bullying.

The next subphase of encoding is classification. In line with the results of Chapter 3, (basic) emotion recognition skills did overall not relate significantly to victimization experiences. However, there are many improvements to make: 1) using varying intensity of emotions (instead of full-blown or 100% only), 2) limiting response and presentation times (instead of long duration) and 3) including social contexts such as a social background scene or verbal situational information (instead of one background color), although the latter would require checks to see which stimuli the participant has attended to (e.g., through eye-tracking). Despite these limitations, conclusions that victims do not seem to differ in general on basic emotion recognition still stand. It remains unclear whether victims differ in more nuanced emotion recognition skills, for example when emotions are only short-lived (micro-expressions), or slowly starting. These are exactly the moments that escalations between persons might happen. Swift recognition of (micro-)expressions means that (negative) escalation may be prevented early on or, alternately, positive interactions stimulated and encouraged. Both can contribute to increased positive social situations for victims.

Several studies examined classification (part of encoding). Victims tend to better remember and recognize teammates (Telzer et al., 2020). Yet, they tend to underestimate their own likability (Garandea & Lansu, 2019; Zimmer-Gembeck et al., 2013) and how often they are included in games (Lansu et al., 2017). This last finding was corroborated by findings in **Chapter 5**, where I found that persistent, and not concurrent, victimization was related to lower perceptions of inclusion while they were included in a game, whereas they did not differ from non-victimized peers in perceptions of exclusion. This might be related to the fact that it is hard to register clear exclusion (receiving 1 ball out of 30) as anything different than being excluded, whereas in the inclusion phase of Cyberball there are more equal distributions of receiving a ball, throwing a ball and seeing a toss between the others. This inclusion scenario with differing events (receiving, throwing, watching others) might be more easily registered differently by individuals. For example, the perception of inclusion may be registered based on the number of times that one received a ball (higher inclusion perception) or the number of times that one did not receive a ball (lower inclusion perception). Such individual tendencies likely depend on one's previous

## Chapter 6

experiences. Hence, victims seem to only differ in more ambiguous situations with the absence of clear inclusion or exclusion.

Overall, there is more ground to gain before firm conclusions can be drawn about the *reaffiliation*, *prevention*, and *desensitization* hypotheses concerning the encoding phase in general. There are few results for the selection of cues which are contrasting at times, sometimes leading to non-significant results and sometimes in line with the *prevention* hypothesis. For classification of social cues, research seems most in line with the *prevention* hypothesis. The differences between subphases of encoding, remind us that hypotheses are not necessarily generally applicable to all SIP (sub)phases and research should focus on varying types of social cues and social situations to gather more evidence to make more substantial claims.

### Interpretation

The second phase in the SIP model is interpretation, which includes making sense of all (attended) social cues together. This SIP phase was examined in Chapters 2, 4, and 5. First, in **Chapter 2** I gave an overview of the state of the literature on interpretation and victimization. Although some contrasting literature exists, victimization generally relates to more negative perceptions of peers and the social climate (e.g., Elsaesser et al., 2013; Hong et al., 2019). There are some indications that the subject of the perception is important: friends and non-involved peers (in bullying) were perceived more favorably by victims (van Noorden et al., 2014; van Noorden, Haselager, et al., 2016). Contrary to the peer perception results, I found that victimization did not relate significantly to skills to understand others, such as empathy or theory of mind (e.g., Berg & Aber, 2015; Caravita et al., 2010). These results need to be interpreted with some caution, as the measurements of these skills were mostly based on self-reports which requires considerable self-reflection to distinguish between the use of and ability to empathize. I also examined attribution of situations. Victimization related positively to higher levels of rejection sensitivity (e.g., Zimmer-Gembeck et al., 2013), attributions of hostile intent (e.g., Camodeca & Goossens, 2005) and expectations of threat (e.g., Balan et al., 2018). There were also some indications that longitudinal associations may exist between negative schemas of interpretation and victimization (e.g., Calvete et al., 2018).

To further examine longitudinal aspects of the association between victimization and interpretation, in **Chapter 4**, I studied the longitudinal interplay between victimization and rejection sensitivity using several (written) scenarios. Moreover, I dissected the between-subjects from within-subjects effects in these associations. In line with the literature, the results included a significant, strong and positive between-subjects association between victimization and rejection sensitivity. Furthermore, there were significant and positive within-subjects concurrent associations and within-subjects auto-regressive associations, but no significant within-subjects cross-lagged associations. Possibly the association between victimization and rejection sensitivity develops earlier than the last years of elementary school, as a large significant between-subjects association was already present. Type of victimization may also have played a role. Persistent victims may already score high on rejection sensitivity and victimization without many changes over time, similarly, non-victims may be scoring low on rejection sensitivity and victimization without many changes over time. Hence, both may not experience within-subjects cross-lagged associations. In contrast, increasing and decreasing victims may experience more changes in both



victimization and rejection sensitivity levels and perhaps show within-person cross-lagged associations. Unfortunately, due to power issues I was unable to examine separate victim profiles in this chapter. In line with this explanation (and previously mentioned in the encoding section), I found in **Chapter 5** a negative association between persistent victimization and inclusion perception during inclusion (in a ball-tossing game). This association was not significant for concurrent victimization, indicating that SIP may differ between different types of victims (e.g., persistent victims and recent victims). In Chapter 5 I also found indications for differential neural processing in the left insula/IFG region (important for cognitive control: Puiu et al., 2020; Tops & Boksem, 2011) during social exclusion for both concurrent and persistent victims, suggesting that social exclusion may be processed differently by victims (also see neuroscience section below). These results highlight the importance of taking different victimization trajectories into account, as would be predicted by the SIP model where the database, including previous experiences and memories, is of influence on each SIP phase.

Taken together, most of the literature on the SIP interpretation phase and victimization provides support for the *prevention* theory. The literature on peer perception and attribution of situations is particularly in line with this hypothesis, whereas the literature on skills to understand others seems to support neither hypothesis. Similar to encoding subphases, the results here also indicate that one hypothesis may not be generally applicable to all SIP (sub)phases. Research on the interpretation SIP phase will also benefit from utilizing different types of social stimuli and tasks, as most research is based on either self-report or vignette questionnaires, which both require considerable self-reflection and imagination skills.

## Behavior

The last phases in the SIP model involve behavior and are goal clarification, response construction, decision of response and behavioral enactment. In **Chapter 5** goal clarification and (emotional) enactment were examined. In this study participants first experienced social inclusion during an online ball-tossing game and then social exclusion when the players were swapped for new ones. Participants' emotional reactions to the game depended on social in- or exclusion. After social exclusion mood and need-satisfaction dropped for all participants and recovered after debriefing that the other players were not real and preprogrammed to respond as they did. Thus, when the interpretation of the social situation changed for children (I was excluded by real peers turned into exclusion by the computer), the emotional consequences changed accordingly. Persistent victimization did not significantly interact with the effects of inclusion, exclusion and debriefing on well-being, although it related to lower mood levels overall. Despite the lack of evidence for different emotional reactions to social in- and exclusion for victimization, I found that only persistent, and not concurrent, victimization related to higher intentions to punish excluders. The more often and intensely participants were victimized in the past two years, the more they were open to hurting the excluders. Concurrent victimization included both recent victims as well as persistent victims. As only persistent victimization related to intentions to punish, and not concurrent, it is an indication that differences exist between recent and persistent victims. This, again, highlights the importance of examining different victimization trajectories.

## Chapter 6

Based on a few findings in a small sample (Chapter 5), the results on SIP behavioral response phases were mixed, but when significant, most in line with the *prevention* hypothesis. Intentions to punish excluders related positively to persistent victimization, but there were no significant interactions between victimization and well-being in relation to being socially in- or excluded.

### Neural responses

Chapters 3 and 5 in this dissertation utilized neuroscientific measures in examining neural activity in response to both emotional expressions of peers and social exclusion through fMRI scanning. As touched upon in the introduction of this dissertation, there are limitations in the neuroscientific literature, including but not limited to generally small sample sizes, few study design replications and no simultaneous measurement of victimization and brain functioning. Nevertheless, neuroimaging studies have some advantages over more traditional measures, like observations, behavioral tasks and questionnaires. First, brain responses can uncover unique information that could not have been measured with traditional measures (Guyer & Jarcho, 2018). For example, children who are chronically disliked by peers (vs. stably liked children) have been found to have heightened neural responses to being socially excluded in an online ball-tossing game, while reporting no differences in mood levels (Will, van Lier, et al., 2016). These (neural results) indicated that different underlying cognitive processes may be at play, whereas that was not indicated by the behavioral measure. Second, brain responses to unmeasurable environmental factors can be measured by carefully thought-out contrasts between presented stimuli (Guyer & Jarcho, 2018). For example, the same stimulus (not receiving a ball) in different social contexts (overall inclusion or clear exclusion) can be examined without explicit questions that would inform the participant about the research aim (Chapter 5).

In **Chapter 3** of this dissertation, I measured implicit processing of emotions of others, without relying on reaction times. These neural results were in line with the behavioral dot-probe results, strengthening the interpretation that victims do not significantly differ in implicit attentional processing of peers' emotional expressions. In contrast, in **Chapter 5**, I found differences between behavioral and neural measurements of social exclusion. There was no significant interaction between victimization and social in- and exclusion on behavioral measurements of well-being and victimization did not significantly relate to inclusion perception when they were excluded. However, I found indications for differential neural processing in relation to victimization during social exclusion (increased left insula/IFG activity), which indicated that victims experience social situations differently. Furthermore, persistent victimization also related positively to intentions to punish. Whereas there were no indications from other behavioral measures (e.g., need satisfaction) that persistent victims would want to punish excluders more often than less victimized peers, results on neural activity did. The insula/IFG region has been related to both (negative) emotional processing (Büchel et al., 1998; Carretié et al., 2009; Mériaux et al., 2009) as well as cognitive control (Puiu et al., 2020; Tops & Boksem, 2011). Increased insula/IFG activity during exclusion (vs. inclusion) in relation to (persistent) victimization can be interpreted as it takes more effort for these children to control their behavior, especially as persistent (and not concurrent) victimization also related to increased intentions to punish. However, intention to punish as a construct did not significantly relate to

the insula/IFG region during exclusion, but instead during inclusion to decreased right insula/striatal circuitry (important for positive reward: Bartels & Zeki, 2004; Rudolph, Davis, et al., 2021). Whereas generally intention to punish may stem from a decreased level of reward that one receives from social situations, for (persistent) victims it may depend more on the level of restraint they can muster in social situations. Thus, intentions to punish may for (persistent) victims rely on more automatic (SIP) processes, whereas refraining from these intentions may rely on more reflective (SIP) processes. These results highlight how neuroscientific results can help researchers understand variation in responses and accentuate again the importance of examining different victimization trajectories.

## Scientific and practical implications

At the beginning of this dissertation, three hypotheses were formulated, the *reaffiliation*, *prevention* and *desensitization* hypotheses. Most of my current findings lined up with the *prevention* hypothesis. There was a notable exception for the encoding SIP phase, where no full consensus could be reached so far. These deviations may not necessarily be (statistical) anomalies but may instead indicate non-uniform associations between social information processing styles and victimization experiences. In other words, one hypothesis might not hold for all SIP (sub)phases. For example in the current thesis, the *prevention* hypothesis was not supported by the results in Chapter 3 on implicit emotion processing, as all results turned out non-significant. These results may suggest that the *prevention* hypothesis may require refinement, particularly regarding the encoding phase. The first tentative refinements could include that the *prevention* hypothesis may only hold for situations with a relevant context, meaning relevant for the perceiver. The results in Chapter 3 were based on emotional expressions that were not relevant to the perceiver (participant): an emotional expression without a (social scene) background and a task not focused on the expressions. Whereas, in the Chapters where tasks were personally relevant, I found associations of social cognition with victimization. In these Chapters, participants had to imagine specific scenarios with their classmates and teachers (Chapter 4) or play an online ball-tossing game (Chapter 5). It is important to keep probing the *prevention* hypothesis from all perspectives, or to quote Ethan McCormick (2022): “we need to hammer our model with a hammer, stick it in the back of a car, bind it up and throw it in the water”, to determine in which situations it holds and in which situations it does not. This way it can be determined when victims’ negative social-cognitive preventative style is least steady, and victims are thus most likely to have positive (social) experiences.

Although the *prevention* hypothesis mainly predicts negative outcomes, researchers should not fixate on negative situations and interpretations. As became clear from Chapter 2, current research mainly focuses on negative aspects in social cognitions, such as negative scenes (e.g., bullying) and interpretations (e.g., rejection). In the current dissertation there were also some positive aspects examined, such as happy expressions of others as well as social inclusion. Although these examinations either led to non-significant results (happy expressions) or more negative interpretations (negative association of persistent victimization and inclusion perception during inclusion), it is important to keep investigating a variety of positive aspects of interactions and social cognitions. Examining these positive aspects may lead to finding factors of victim resilience, such as having high-quality friendships and supportive parents (Healy &



## Chapter 6

Sanders, 2018). Focusing on strengths of victims can also help improve anti-bullying interventions to increase resilience in victims without fully depending on the classroom. Such an approach may return a sense of control to victims. Generally, victims already feel less in control (Andreou, 2000; Hunter & Boyle, 2002), and the power needs to be returned to them (or at least to some extent).

Based on this dissertation there are also methodological implications. First, the NOS was updated to more adequately assess the quality of psychological research and reward best scientific practices. Several important updates were made that need to be stressed. First, stars are now awarded for using validated (self-report) questionnaires, whereas before they were only rewarded for objective tests. An update was required as common constructs in (psychology) research, such as perspectives and opinions, can typically not be measured objectively. A second update was the inclusion of control variables, to encourage accounting for the complex (social) world we live in where constructs cannot be readily isolated from one another. A last and important update involved appointing a star for pre-registration. Pre-registration helps researchers to better design their research and analysis plans before they analyze the data, which should improve analytical approaches. Pre-registration efforts help improve transparency and also help readers understand the quality and meaning of study results. The existing studies did not score considerably high on the improved NOS (on average 8.5/16 stars). Common weaknesses included a lack of reporting effect sizes, using validated measures, adopting longitudinal designs and completing pre-registrations. Admittedly, pre-registration is a newer development in science and assessment might be unfair to older studies. However, in the systematic review only five studies mentioned pre-registration of analyses or clearly distinguished between confirmatory and exploratory analyses. I designed the studies in this dissertation to improve on those aspects, which led to scores of 10-12 out of the 16 possible stars (in the review 3.8% received 12 stars or more and 31.4% received 10 stars or more). I challenge researchers to beat the quality ratings of the current dissertation in the future, there is definitely room for improvement.

Second, in longitudinal analyses between-subjects effects are often not separated from within-subjects effects. In Chapter 4 I found no evidence for the existence of within-subjects cross-lagged associations between rejection sensitivity and victimization. However, when examined with regular cross-lagged panel models, there was some evidence for the existence of cross-lagged paths. This regular approach potentially involves a confound between within- and between-subjects effects. Interventions based on these confounded cross-lagged effects may then be doomed to fail, whereas the true effects involved stable between-subjects differences and very small to non-existent within-subjects effects (Hamaker et al., 2015; Masselink et al., 2018). Good analytical approaches are required to make well-informed decisions for interventions. In the SIP and victimization literature, the approach of distinguishing within- from between-subjects effects is rarely taken, likely due to the (general) lack of longitudinal studies. The general lack of longitudinal studies is concerning. Cross-sectional studies are appropriate for examining differences between persistent, recent and non-victims. They cannot, however, substantiate whether these differences were pre-existent or developed over time due to victimization trajectories. In the current dissertation, I already mentioned that different victimization trajectories are likely to relate differently to SIP. For example, only persistent and

not concurrent victimization related to more intentions to punish excluders, lower overall mood levels and lower inclusion perception when they were included. These are indications that the duration of victimization experiences may be of influence on SIP development (as predicted by the SIP model), or alternatively, that persistent victims already have different pre-existent SIP. Reiterating the need for longitudinal designs and the dissection of within- and between-subjects effects is therefore not in vain.

Third, some decisions were made in this dissertation that were in hindsight not optimal. A prominent one occurred in Chapter 3, where I wanted to analyze the data with trial-level bias scores (TL-BS: Zvielli et al., 2015). However, as the design included four interleaved conditions (happy-neutral, angry-neutral, afraid-neutral, neutral-neutral), trial pairs that needed to be compared to attain this TL-BS were typically too far apart. I chose to interleave different emotion conditions to prevent habituation. Future researchers using dot-probe tasks should consciously decide whether their research question gains the most from accounting for varying attention with TL-BS scores (with the possibility of habituation to the stimuli) or from interleaving conditions to contrast different emotions.

The main practical implication of my dissertation relates to the findings that (persistent) victims generally experience and interpret social situations more negatively than their less victimized peers (Chapters 2, 4, 5) and they are likely to have more retaliatory intentions (Chapter 5). Hence, interventions that want to take victims' SIP into account are more likely to achieve improvements if they focus on the interpretation and response phases of the SIP model. Peers, teachers, and even parents may not necessarily see the situation similar to the victim's perception (Paljakka et al., 2021; Zimmer-Gembeck et al., 2013). Therefore, it is important that they take it seriously when victims open up about being victimized. Support is an important factor, as it may improve victims' well-being (Kim et al., 2022; Ngo et al., 2021). Indeed, recent research found that victims' emotional well-being improved after help from others and especially when they helped to resolve issues or helped the victim to calm down (Strong et al., 2022). Moreover, it may be crucial for victims to explore their full range of emotions to deal with and get past the bullying incident (Watson et al., 2021). Taking victims' experiences seriously and acknowledging their feelings are of fundamental importance in interventions and should never be forgotten.

## Future directions

The main aim of this dissertation was to examine SIP of persistent victims of bullying and to search for (new) factors that interventions can target to improve their experiences. Persistent victims bear hardship through the endurance of severe bullying, leading to decreased mental well-being that can last into adulthood. Despite the consequences of severe victimization experiences, little research exists on this persistent victim group as they are difficult to reach and require longitudinal approaches. The current dissertation provides evidence that SIP differs between concurrent and persistent victims (e.g., Chapter 5: intention to punish related significantly only to persistent victimization). Based on the SIP model and previous literature (Bernstein & Claypool, 2012; Williams et al., 2021) the different hypotheses may be formulated for victimization experiences over time: for new (and increasing) victims as well as decreasing victims the *reaffiliation* hypothesis may generally hold, whereas for continued (but not very severe) victims the *prevention* hypothesis may hold and for (severe) persistent victims the *desensitization*

## Chapter 6

hypothesis may hold. To be able to examine these different trajectories and changing social-cognitive styles, future research should more often adopt longitudinal designs with large samples to be able to distinguish different victimization trajectories. This proves difficult, as I have experienced over the course of this dissertation trajectory. Future researchers can benefit from close collaboration with schools, to have data collections take place at the school and limiting the burden for parents to come to the facilities and spend time for their children to participate. Such a collaboration requires frequent contact with schools and teachers to build rapport. If they are on board and deem the research important, they are more likely to convey this message to parents and can ask for the (active) informed consent forms. This should increase participation rates, recruit participants with more diverse SES backgrounds and increase the odds of including persistent victims.

In addition, in this dissertation I aimed to examine neural correlates of SIP in relation to victimization. Victimization, both concurrent and persistent, related to increased activity in the left insula/IFG region during social exclusion. This result was interpreted in concordance with behavioral results as well as existent literature on the function of the activity cluster. Future research should use the convergence of insula/IFG indications in this dissertation with previous victimization studies (Kiefer et al., 2021; McIver et al., 2018) to form more directed hypotheses, including a strict region of interest (ROI). Furthermore, a deeper understanding of neural processing could be achieved with multi-voxel pattern analysis (MVPA), which examines patterns of brain activity instead of summary values like common univariate analyses (Haxby et al., 2001; Pereira et al., 2009). In MVPA classifiers are trained on a training dataset to find common patterns of activation per condition. The trained classifier is then used on a testing dataset in which it classifies brain activity on new trials in the previous conditions to which the new trials are most similarly processed as. Classification percentages can be retrieved per participant to see whether continuous (between-subject) variables (e.g., victimization) relate to different categorization percentages of the testing dataset. With this type of analysis it can, for example, be examined to which type of stimuli (from the training dataset) the new stimuli (testing dataset) are most similarly processed by the examined brain region. In this dissertation (Chapter 5), contrasting incidental exclusion with inclusion led to one occipital brain activity cluster in the (univariate) whole-brain analysis, whereas contrasting explicit exclusion with incidental exclusion led to two brain activity clusters (occipital lobe and ventral striatum). Both did not significantly relate to victimization, suggesting that victimization does not relate to differential neural processing of incidental exclusion. However, based on other (behavioral) results in this dissertation the *prevention* hypothesis was mostly corroborated, indicating that victims are more likely to make negative attributions. To test the *prevention* hypothesis with neural data, an MVPA could be used on the incidental exclusion, explicit exclusion and inclusion data. The inclusion and explicit exclusion trials could be used as a training dataset, and the incidental exclusion trials as a testing dataset. The participant classification percentages of incidental exclusion as explicit exclusion can be retrieved and regressed on victimization experiences. If the association is positive, it would indicate that neural processing of incidental exclusion by victims is more similar to explicit exclusion than inclusion, supporting the *prevention* hypothesis. If the association is negative then it would indicate that neural processing of incidental exclusion is more similarly processed as inclusion by victims, supporting the *reaffiliation* hypothesis. Similarly, MVPA analysis

can be used on the neural processing of neutral facial expressions to examine whether they are processed more similarly to negative or positive emotional expressions by victims. This way it can be examined whether victims' brains may also "have" negative interpretation biases. Future research could take these steps to further integrate behavioral and neural examinations of victimization and SIP, as currently, neural processing is not integrated into the model.

A recurrent aspect in this dissertation concerns ecological validity. In Chapter 3 I used an emotional dot-probe paradigm and an emotion processing fMRI task. Both these tasks were devoid of social context and the examined emotional expressions were not relevant to the participants' task. Moreover, the tasks were unlikely to be emotionally engaging. In Chapter 4 I used vignettes to measure rejection sensitivity. Participants had to imagine that they were the protagonist in the vignette, what they thought would happen in the scenario and how they would feel (without time restrictions). These tasks are unlike real-life situations, where social cues are selected from a scene, taken in, and, especially in emotional situations, interpreted in split seconds. Requiring participants to pay attention to a single face at a time without a background and giving them a repetitive task is quite unlike how one encounters faces in real life, although very capable to examine fundamental encoding aspects. Furthermore, making participants reflect explicitly on what they think would happen, likely does not resemble fully how they would automatically react in these situations. In Chapter 5, I used the Cyberball paradigm, which is emotionally engaging, and despite MRI scanner surroundings, quite ecologically valid. Although anecdotal, there are clear examples that Cyberball is quite emotionally engaging. The participants reacted more intensely after exclusion during Cyberball than when they imagined the (ambiguous) rejection scenarios (the latter not reported in this dissertation). For example, multiple participants verbally reacted disappointed after the exclusion block when we talked to them in the scanner (e.g., "I didn't get the ball at all!"). One participant even seemed to play a piano concert when the exclusion continued (slightly resembling *La Campanella* of Liszt). Last, several other participants made disappointed comments when they won money for their excluders later on (not reported in this dissertation). Future research should continue to utilize paradigms with high(er) ecological validity, to explore whether those results align with the results of more fundamental yet less ecologically valid paradigms.

Related to ecological validity are recent theoretical efforts to update the SIP model with automatic and reflective SIP modes (Verhoef et al., 2022). The automatic mode is described as "fast implicit processing and consists of basic appraisal and a dominant action tendency" (Verhoef et al., 2022, p. 43). During high arousal, such as during bullying and socially stressful situations, this automatic mode will be more likely activated. To specifically examine automatic SIP, paradigms need to be time restrained as well as emotionally engaging. A good example of such a paradigm is Cyberball, as discussed above. Likely, results on (paradigms aimed at) automatic SIP reflect more on how victims would respond in real social (stressful) situations. Future research should therefore increase efforts to examine automatic SIP more thoroughly.

Last, the SIP model was developed originally as a sequential model, but reformulated with feedback loops and a cyclical structure to allow for parallel processing (Crick & Dodge, 1994). Even though this model is based on the connection between these SIP phases, research often examined these phases in isolation. In this dissertation, I examined each SIP phase and provided connections by interpreting results in light of overarching hypotheses. Although a good

## Chapter 6

first step toward integration, future research should exceed current efforts and explicitly examine the interconnection of the SIP phases to examine if current (*prevention*) hypotheses receive further support. Virtual reality games that include social interactions could be used to better resemble ecological validity, be emotionally engaging, examine automatic instead of reflective SIP and explore the full cycle of SIP.

### Conclusion

To summarize, persistent victimization is tough, for researchers to examine, and especially for victims themselves to experience. This dissertation is only the first step in examining persistent victimization in relation to SIP and its neural correlates, and to identify potential processes that might help increase (persistent) victims' resilience. Currently, there are no strong indications of differences in fundamental encoding aspects of social information by victims, such as (implicit) emotion processing. However, victimization (regardless of severity and duration) seems associated with a more *preventative* social-cognitive style. Victims have clear tendencies to have higher expectations of threat, have more negative perceptions of peers, interpret ambiguous situations more often as rejection and interpret intentions of others as hostile. These tendencies may even be reflected in the neural processing of social situations, as victimization related to stronger insula/IFG activity during social exclusion. For persistent victims, these (behavioral) tendencies seem stronger. Peers, teachers and parents should be compassionate and show understanding, also if (persistent) victims are likely to react more strongly to rejection experiences. Interventions targeting interpretation and response SIP phases seem most fruitful, although more research is needed before interventions are updated with current knowledge on (persistent) victimization and SIP.



