



“We are also normal humans, you know?” Views and attitudes of juvenile delinquents on antisocial behavior, neurobiology and prevention

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ABSTRACT

This paper presents and discusses the views and attitudes of juvenile delinquents regarding the implications of genomics and neurobiology research findings for the prevention and treatment of antisocial behavior. Scientific developments in these disciplines are considered to be of increasing importance for understanding the causes and the course of antisocial behavior and related mental disorders. High expectations exist with regard to the development of more effective prevention and intervention. Whether this is a desirable development does not only depend on science, but also on the ethical and social implications of potential applications of current and future research findings. As this pilot study points out, juvenile delinquents themselves have rather mixed views on the goals and means of early identification, prevention and treatment. Some welcome the potential support and help that could arise from biologically informed preventive and therapeutic measures. Others, however, reject the very goals of prevention and treatment and express worries concerning the risk of labeling and stigmatization and the possibility of false positives. Furthermore, interventions could aim at equalizing people and taking away socially disapproved capacities they themselves value. Moreover, most juvenile delinquents are hardly convinced that their crime could have been caused by some features of their brain or that a mental disorder has played a role. Instead, they provide social explanations such as living in a deprived neighborhood or having antisocial friends. We suggest that the hopes and expectations as well as the concerns and worries of juvenile delinquents are relevant not only for genomics and neurobiology of antisocial behavior, but also for prevention and intervention measures informed by social scientific and psychological research. The range of patterns of thought of juvenile delinquents is of great heuristic value and may lead to subsequent research that could further enhance our understanding of these patterns.

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1. Introduction

Genomics, neurobiology, and neurophysiology contribute to the understanding of the causes and course of antisocial behavior, and of related mental disorders, such as conduct disorder (CD) and oppositional-defiant disorder (ODD) in children. Genetic polymorphisms, structural and functional deviations in the brain, and aberrations in psycho-physiological responding to stress have been demonstrated in individuals exhibiting antisocial behaviors (Baker, Bezdiĳan, & Raine, 2009; Bevilacqua et al., 2010; Dadds & Rhodes, 2009; Fishbein, 2000a; Hodgins, Viding, &

Plodowski, 2009; Popma & Raine, 2006; Shirtcliff et al., 2009). Although scientific research on biomarkers of mental disorders is still in its infancy, there are great hopes and expectations with regard to future applications of these findings for early prevention and treatment of antisocial behavior. Early identification of children at-risk, the sub-typing of children (e.g., children with/without callous-unemotional traits) (Beauchaine, 2009; Fishbein, 2000b; Viding, 2004; Viding, Larsson, & Jones, 2009), the differentiation between types of antisocial behavior (e.g., proactive/reactive aggression) (Dadds & Rhodes, 2009), as well as the development of targeted psychopharmacological interventions, possibly adjunctive to psychological interventions, could result from this type of scientific research (Beauchaine, Neuhaus, Brenner, & Gatzke-Kopp, 2008; Frick & Pettitclerc, 2009; van Goozen & Fairchild, 2008).

While scientific research progresses, its social and ethical implications are still largely unaddressed. Currently, one basic assumption of scientists dominates the field: This kind of research will lead to better and more effective prevention and intervention methods and thereby bring about a win–win situation in which all concerned are better off

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(Beauchaine et al., 2008; Fishbein, 2000b). Youth at-risk may await a better future and less incarceration and society will be more effectively protected against serious forms of antisocial behavior. However, it is unclear whether, and if so, under which circumstances, these assumptions are justified. This will not depend on scientific progress alone, but also on the views and opinions of the target-groups of these interventions. In order to identify and explore relevant social and ethical questions, it is important to investigate the 'social life' of biomarker information, that is, to explore how relevant stakeholders actually perceive and deal with it. This, in turn, requires qualitative stakeholder research. Preferably, this kind of research takes place pro-actively, that is even before scientific findings are actually translated into practical assessment and treatment methods, because applications could evolve that have no support from the stakeholders or that even cause serious harm (Singh & Rose, 2009). For example, ideas about the identity and capacities of individuals at risk may change in rigid, coercive or stigmatizing ways and thereby negatively affect these people's life-trajectories.

In medical genetics, qualitative research is frequently used to investigate the social and normative aspects of genetic testing or screening among affected patients and their family members (e.g., Bredenoord, Krumeich, de Vries, Dondorp, & De Wert, 2010; Dancyger, Smith, Jacobs, Wallace, & Michie, 2010). In behavioral genomics in general, and in the genomics of antisocial behavior in particular, such studies are hardly conducted. Although there are a few exceptions (Campbell & Ross, 2004; Levitt & Pieri, 2009; Pieri & Levitt, 2008), serious gaps exist in our knowledge concerning stakeholders' perceptions of the possible impact of these new scientific developments. Pieri and Levitt (2008) interviewed professionals working with individuals 'at-risk' of displaying violent and aggressive behaviors and Campbell and Ross (2004) interviewed health care professionals and parents about their views on new genetic technologies and genetic testing for traits predisposing to violence. Yet, neither study talked to antisocial individuals themselves and their voice remains unexplored to date. The views of antisocial juveniles, however, seem to be of particular importance. First, many of the applications currently envisaged target early identification and early prevention of the development of antisocial behaviors and therefore will mainly affect young children and juveniles. Therefore, they are important stakeholders and sound ethical decision making requires that their voice is heard (van Willigenburg & van der Burg, 1998). Second, their voice may enrich the debate, because as experiential experts they have a rather specific perspective that may throw another light on the issues discussed or that may introduce new elements hitherto overlooked or neglected. Furthermore, their perspective may be considered important because knowledge about it may facilitate the development of measures that increase "motivation, commitment, effort and compliance as well as [...] reduce] opposition and rejection" (Wiethoff et al., 2003, p. 90). This knowledge could take away possible barriers and facilitate future implementations.

The purpose of this pilot study is largely heuristic. It reveals the range of thoughts and considerations held by antisocial juveniles concerning the genomics and neurobiology of antisocial behavior and its possible consequences for future prevention and intervention measures. Three issues are the focus of this study: i) views on perceived explanations of the crime and attitude towards biological explanations, ii) views about forensic psychiatric and psychological treatment and possible coercive preventive treatment, including perceptions of psychopharmacological treatments, and iii) views about early detection and identification of children at risk of antisocial behavior.

In this article, two key terms will be used: *crime* and *antisocial behavior*. Their meaning overlaps, yet is not identical. The term *crime* or *criminal act* is used for serious deeds forbidden by the criminal law and that lead to a conviction and placement in a juvenile justice institution. Antisocial behavior, however, is a psychiatric term that refers to a variety of behavioral disorders that hamper an individual's functioning in a broader social setting and that cause significant harm to others.

2. Method

2.1. Participants

The study was conducted at 'Het Keerpunt', a Dutch juvenile justice institution, part of 'Stichting Jeugdzorg Sint Joseph' [Youth Care Foundation Saint Joseph]. We recruited participants from this institution only. However, juveniles are admitted from all over The Netherlands. Only males were admitted to this institution. Most participants are convicted for a serious crime, some were admitted on remand. Of those who were already convicted, some only received a prison sentence. Others, however, received a so-called 'PIJ-order' (Placement in an Institution for Juveniles) which means that they are obliged to undergo treatment for a behavioral disturbance or mental disorder. Juveniles sentenced to such mandated treatment stay significantly longer (up to six years) in the institution than juveniles with a custodial sentence (up to two years). All juveniles were aged 14 to 17 at the moment of their offense, yet at the time of the interview the age-range was between 16 and 24. We included both juveniles with and without a PIJ-order, but excluded those with an IQ below 70 and those who could not speak Dutch. All eligible juveniles who volunteered were given the opportunity to take part in the study, such that the group of participants resembles a cross-section. Ethical approval for this study has been obtained from the Medical Ethical Committee of the Academic Hospital Maastricht and Maastricht University, approval number 10-4-053.4/pl. Written informed consent was obtained from all participants and additionally from parents in case participants were below the age of 18.

2.2. Instrument

We conducted semi-structured individual interviews. The choice for this method was partly based on advice given by the professionals who work with these juveniles on a daily basis. They recommended interviewing juveniles individually rather than in a group format, because participants would probably speak out more frankly, if no others from their living-group were present. The interviews were semi-structured, allowing for individually adapted following through on the issues of this study. In this way, it is possible to examine more in detail the reasons behind answers and to understand why each of the juveniles holds a specific view.

When preparing this study, professionals expressed the concern that it might be rather difficult to interview these juveniles, who frequently have a low level of education, about abstract and complex issues. For this reason, we used concrete and brief formulations of questions, we adapted the language and we explicitly mentioned potentially relevant issues in case juveniles did not mention these themselves. The emphasis is on understanding participants' views and attitudes and to discover the range of patterns of thinking, rather than their prevalence. Every finding is important regardless of the frequency by which it gets mentioned.

2.3. Procedure

In order to recruit participants the first author visited all eligible living-groups. She explained the goals and the design of the study and asked juveniles whether they would be interested to participate and to give their views. Overall, recruitment was satisfying. Thirteen juveniles took part which was about 50% of the eligible group. Among those who did not take part in the study, some refused, others were released between the day of recruitment and the day of the interview, were absent from the juvenile justice institution during the day because of reintegration activities in the community, or did not receive permission from their parents.

The interviews were conducted by the first author. Prior to each interview the juvenile was provided with background information

about the state of the art of biological research into antisocial behavior and about the expectations of researchers for the future. We conducted two pilot interviews on the basis of which our questions were adapted and fine-tuned. We did not formally test understanding of this information, yet during interaction with the juveniles it became obvious whether they understood what was explained to them, and if necessary, there was ample opportunity for adjustment of possible incomprehension. The interviews lasted between 20 and 50 min and took place in a classroom of the juvenile justice institution. All interviews were audiotaped and transcribed verbatim.

2.4. Data analysis

All interviews were independently read by three members of the research team (DH, RB, GdW). Data analysis was based on the inductive constant comparative method (Corbin & Strauss, 2008) involving the following steps. DH independently coded the transcripts by labeling sections and text units referring to one or multiple concepts relevant for the study purpose. She then gathered codes of similar content to categories, that is, the patterns of thinking. Interpretative bias of data was avoided by means of investigator triangulation which entails that three researchers (RB, AK, and GdW) checked the codes for consistency. They independently coded parts of the data and compared their coding and categorizing with that of DH (Polit & Beck, 2011). Independently, all four researchers observed congruency. Data analysis was conducted by means of NVivo (Batzeley, 2007), a computer software package for analysis and qualitative modeling of non-numerical data. Because of the qualitative nature of the data, the specific purpose of the study, the comparatively low N, and the fact that each finding is considered equally valuable, prevalence numbers are of minor relevance. Instead, and as it is common practice in this kind of research, frequencies are indicated in broad terms (most, many, some) and no statistical analysis was used, neither were associations between certain demographic features and specific views claimed or even looked for. The value of this pilot study is heuristic, providing for insights in the range of different patterns of thinking and allowing for further theory-building in the domain researched. Further social science research gives the opportunity to conduct statistical testing based on the here identified range of thoughts. Representative quotations were chosen to illustrate the views and attitudes expressed by participants. All quotes were translated from Dutch by DH while retaining the verbatim character of the original statements.

3. Results

3.1. Perceived causes of criminal acts

Due to privacy reasons, we had no access to the files of the juveniles and thus no background information about the crimes participants had committed. It was up to them what they wanted to tell about their criminal acts. No direct questions were asked about the crime a participant had been convicted for, but we did ask them to provide an explanation. Nonetheless, almost half of the participants ($n=6$) mentioned (aspects of) their crimes spontaneously. All were willing to share why they have committed the crime. There are three different explanations participants link to their crimes.

First, participants point out that the crime was the result of an intentional or goal-directed action and they mention several purposes they wanted to achieve. Participants who say they are convicted for robbery or stealing, frequently state that they simply needed money and this was their way to get it. At least in the short-run, participants considered this as the solution to their financial problems:

Then you need to have this money, and then there is only one easy way and not to work or so, that is to hold up and snatch the money from the people or somebody on the street. (J11)

Another reason that is given why a serious crime has been committed was that one wanted to be cool and show others that one is strong, not a softy:

I just wanted to show everybody, I'm not a softy, I am strong, you know, what are you all thinking about me? (J10)

Second, participants argue that their crimes and other problems in their life 'just happened to them'. They have lived in bad neighborhoods with nothing to do for young people. Together with other youngsters they have caused problems. They report that their parents were not really monitoring them or that they were in constant conflicts with them and that they have lacked their help or support. In such a situation, it has been a small step to join other deviant youngsters. They have followed their deviant peers, were easily influenced and have not realized that they also could have said 'no' to what others suggested. They have experienced their background as deprived and argue that in such a situation everything, including their criminal and antisocial behavior, has started automatically:

Placed into care, problems at home, and I have been in residential institutions since I was 12. Yes, had many problems, hung around with the wrong boys, hence yes dragged along and waited actually. Then, yes these kinds of things happen by themselves, actually. That you want to go into this direction. (J2)

Third, specific psychological conditions, mainly due to intoxication by alcohol or soft-drugs, the usage of which is tolerated in the Netherlands, are mentioned as an explanation for criminal behavior:

I think, anyhow with my use of drugs, smoking hash. It also had to do with that. It also has much impact on your brain, on your way of thinking and on your whole body in principle. For sure that was the case at that moment. (J9)

Besides the reasons that participants give for their offenses, they frequently also have a clear opinion about factors that definitely did *not* underlie their behavior. Aggression, for example, is hardly mentioned and frequently explicitly denied as being applicable to them or as having caused their crime:

No, I am not aggressive. (J1)

Yes, anyhow I do not think that I have an aggression problem. (J7)

[At the time of the offence] Not with me but my friend he was aggressive [...] Yes, let's say, aggression, yes he gave a punch to the one, the one that we have robbed. But I myself I was not aggressive. (J13)

Further, participants who received a psychiatric diagnosis hardly consider this to be associated with their crime. With a few exceptions, they do not reject their diagnosis, but rather it is meaningless to them. In some cases, they have forgotten the exact diagnosis, or cannot remember the correct term. However, even if the diagnosis is remembered well, it is hardly considered relevant or linked to the particular crime. Others state that they have a disorder and that's it. In their view, the criminal act was caused by other factors.

Yes. I think yes, a couple of years ago there has been, I have been and they have made a diagnosis of me. But what I had exactly I do not know. What I still know is that they said that [...] I had a damage at the right side of my brain and that I cannot feel emotions, or express them or something like that. But I do not know

exactly what the name for that was [...] It's so long ago, actually. (J7)

According to the personality assessment I have a behavioral disorder. It concerns narcissistic things and so and to be easily impressionable and has to do with use of soft drugs. (J8)

Finally, participants do not believe that there is anything that makes them different from others. Instead, it seems they regard themselves along a continuum with other people: Essentially all people are the same, with some small differences. As convicted criminal juveniles they are not different in any significant way.

And I know that, I am just a normal boy [...] We are also normal humans, you know? (J8)

Yes, okay, everybody is different and everybody has his own manner of thinking and acting. (J9)

Yes everybody has something, something which is less good, some are shy, some are more easily aggressive, you name it. Yes, some do not easily say yes, or some do not easily say no. You know? (J12)

Despite the various reasons that participants provide for the occurrence of their problems in life and for their crimes, most of them also state that they had a choice and that it was their own choice to commit the crime. This does not only hold for those who say that their crime was intended or goal-directed, but also for those who describe their circumstances as deprived and their crimes 'to have happened' to them. Moreover, the view that one's behavior and one's crime was one's own choice is argued both to hold for them personally but also in general, that is, everybody makes a choice when he behaves aggressively or commits a crime. Choices can be wrong, obviously, but they remain one's own choice and one should not put the blame on somebody or something else.

In the end the person makes the choice himself. It counts that he makes the choice more easily, but for me the same is the case. The choices I have made, also had a share in my past. But in the end I am the one who has made these choices. (J3)

3.2. Views on preventive and therapeutic treatment

Participants express a range of attitudes towards the treatment of behavioral problems. This holds both for hypothetical preventive treatments to be applied to children at-risk but who have not committed any crime, and for the actual therapeutic treatments they themselves receive, or at least could receive, in the juvenile justice institution. While some are clearly in favor of being treated now or are positive about the idea that they could have received a preventive treatment during their childhood, others reject all types of treatment under all circumstances. Further, there are participants who adopt a somewhat in-between position, who reject treatment efforts under certain conditions and for specific reasons, but in principle are willing to cooperate.

Participants give three reasons why treatment is a good thing. First, treatment provides help and support. Applied preventively, it can teach a child how to deal with his problems more adequately and to react in an adaptive way even if situations are unpleasant or difficult. This is considered a worthwhile goal:

Yes, in order to learn to deal with it. There are plenty of people that perhaps just like me have a personality disorder or who are behind socially and emotionally, but they don't have problems with that, they just can live with it. And yes, I indeed had problems with that, by which I ended up here. Yes, if somebody then would help you to deal with it, then yes. (J3)

Getting help in dealing with problems is not a goal in itself. The ability to deal with problems is valued, because it may help juveniles to have a better future. Particularly therapeutic treatments are considered to have this potential, because professionals do not only look at the problematic behavior or the actual crime, but they are also trying to find out why a juvenile acts in the way he does and what the real causes for the behavior are. Professionals are also considered to be able to differentiate between several kinds of causes and maybe can adjust treatment methods individually or according to the underlying problem:

Very often there is a specific background why a juvenile does something like that and here where I am now you get a treatment to examine where it comes from that behavior, what the reason is that a juvenile shows this behavior and yes what could be done about it. (J3)

Second, participants appreciate preventive treatments, because these could help avoid future punishments. If a treatment is successful, it is argued, juveniles will no longer show the problematic behavior and further punishment becomes superfluous. Finally, one of the participants points out that the treatment of a juvenile could indirectly also support the parents who are responsible for the upbringing of a child with behavioral difficulties. They would no longer have to face the problem alone and their task could become less burdensome, if also professionals get involved with the child.

However, not everybody welcomes treatments. Some participants are particularly opposed. Again, three different reasons are mentioned. First, some are suspicious about the intended outcomes of whatever treatment efforts. They believe that professionals want to make everybody the same, to behave in the same socially desired way, and to take away a person's unique features:

So, do you want to make robots, do you want to change, no, why? (J5)

Second, treatment may change an individual's specific characteristics. In particular, the capacity to behave aggressively and to be angry can also be of significant value. Consequently, if a treatment is intended to reduce aggression and anger, this can be a bad thing. One should not take away a person's emotion, because that is something natural and something everybody has. Moreover, aggression and anger are not only to be evaluated negatively. These are also qualities that help one achieve goals and to maintain personal dignity and a significant social position:

Anger you need, if you cannot become angry you are worthless. If you cannot put somebody onto his place, you do not have a place yourself. Therefore you may perhaps need violence sometimes. (J1)

So I think that for example very aggressive boys, if one has a martial arts that one practices, that one perhaps by this extra piece perhaps has a chance to become champion. (J7)

Finally, even among those who do not reject the intended outcomes of treatments, the significantly longer average duration of the stay in the institution of juveniles with a PIJ-order as compared to a detention placement, is a clear reason to reject forensic psychiatric treatment. Maybe no treatment implies no help, but it does also imply shorter institutionalization:

It should not have too much consequences. I mean I also did examination with the psychologist and the psychiatrist and I got the PIJ. If only I had not done that, I sometimes think to myself. (J8)

But I don't think that people are all going to take medicines or so, or something else, or that they let something be treated or so.

Because people like us know that yes treatment and so, I mean that are eight years that you can be locked up. (J11)

For many participants, however, the value of treatments is not a black or white issue. Instead, whether treatments are welcomed depends on the means involved in particular treatments and the conditions under which they are provided. In court-ordered treatments, coercion is a fact and no longer a point of discussion, but participants are rather critical and opposed if preventive treatments would ever be coercively applied. Four reasons can be identified why coercion is rejected, three of which are related to the child himself. The fourth refers to a potential danger to the parent–child relationship. First, being coerced to receive treatment can give children a bad feeling. It goes against their will and that alone is sufficient to constitute an undesirable situation. Second, treatment can only be effective and helpful in case the person affected agrees with the treatment. If someone is not willing to cooperate, the treatment cannot have the intended effect.

Yes, I think that then (if coerced) they will just react in a socially desired way to questions or they will just let happen the treatment in order to be rid of it as soon as possible, and then yes the problems start again, I think. (J2)

Third, coerced treatment may even have counterproductive effects. Children or juveniles may become actively opposed to the fact that they receive a treatment and may show more problematic behavior than they otherwise would have. Finally, several participants closely associate coerced preventive treatments with a court custodial order and hence with a situation in which not only children but also parents, or the parent–child relationship will be harmed. Notably, regarding preventive treatments, most participants argue that parents should have the last say about what happens with their child and whether or not he cooperates with any intervention:

It could be, for example, that it will not become like that at all. A child becomes a risk-child and yes that parents are just by themselves going to do everything to see to it that this is not going to happen. Wait whether parents succeed, yes and then I do not think that one has to force them to say that he has to participate in a treatment. Then I think that one first must give them a chance to try it on their own. (J4)

Beyond their criticism of coercion and their preference for voluntariness, however, participants also mention circumstances in which preventive treatments could be helpful and should be implemented. For example, parents could agree to have their child tested and eventually be given a treatment, but the child himself may be too young to understand the situation or may be unwilling to receive treatment. In that case one should either wait until the affected child reaches sufficient capacities to make a decision on his own or, at least, until actual and serious behavioral problems have developed. A reason for this reluctance is that preventive treatment is sometimes considered a form of punishment: One should not punish someone for something he has not done and maybe will never do. Another alternative that was mentioned, and that also could help avoid the problems of treating young children, is the treatment of the parents themselves. Some participants assume that parents have many problems themselves and that treatment of the parents could contribute to the prevention of behavioral problems in their children.

Another relevant point in the evaluation of preventive treatments does not concern the circumstances, but the concrete methods and means that may be used. Current research in neurobiology and neurophysiology has repeatedly suggested that next to environmental interventions, new forms of psychopharmacological interventions may be developed (Coccaro, Kavoussi, & McNamee, 2000; Fava, 2000; van Goozen & Fairchild, 2008). Therefore, we asked participants about their views on the use of medications as part of a treatment and to compare the desirability of such interventions with psychological treatments as

presently offered. Again, opinions diverge widely. Some participants are clearly in favor of psychopharmacological agents. An important reason is that they hope for and expect extra support by this. This holds in particular in case participants perceive their own behavior as highly problematic, experience their problems as difficult to treat, or presume that no negative-side effects are to be expected:

I think that then I would try out whether it is then better with or without. Yes, if it is difficult to solve, I would dare to give it a try to then eh the medicines and all. (J2)

On the other hand, psychopharmacological treatment also clearly meets opposition. It is considered nothing but a drug and one does not want to be ‘a junkie’:

Further, I do not take that junk. You should know it for yourself, but I do not eat that, I also do not need and all, but I do not eat that anyhow, the rubbish. (J8)

Next to this overall opposition, juveniles also mention a great variety of specific reasons against psychopharmacological agents. If one takes medicines, one does no longer solve one’s problems on one’s own. Psychological treatments are considered more natural and therefore preferred. Participants who have experiences with antidepressants and sedatives further argue that these agents in themselves do not solve the problems. Medications also have negative side-effects and one can become dependent on them. Further, participants fear that psychopharmacological agents change people in a way that they are no longer themselves:

Yes, to use pills then, I think something like, yes, if you really have problems with your heart or so, yes then I can understand that you then use pills. Or if you have diabetes. But if one is really, for example, always irritated or, that must be by means of talks I think that sometimes has to come out. That you, yes, yourself are solving the problems. But not by just taking some pills. And that then the pills try to solve it for you. (J12)

3.3. Views on early identification and detection

It has frequently been suggested that the prevention of antisocial behavior should start as early as possible. “It is never too early” is a slogan that does not only hold for social or psychological interventions (Farrington & Welsh, 2007), but also the results of neurobiological and neurophysiological research repeatedly are taken to indicate the relevance of early applications of preventive measures (Beauchaine et al., 2008; Frick & Petittlerc, 2009; Robinson & Kelley, 2000; Shirtcliff et al., 2009). Neurobiological markers are considered indicative of an individual risk for developing antisocial behavior. Early prevention requires the early identification of individual children at-risk. Participants have mixed opinions about the desirability of the detection of at-risk children early in life and also about whether they would have appreciated being identified as ‘at-risk’ themselves. They provide a variety of reasons for both affirmative and dismissive attitudes.

The main reason why early detection would be desirable is that it could prevent children running into difficulties later. When tested early and an increased risk for antisocial behavior is detected, children and their parents could know what to expect for the future and could take that risk into account in their daily life. If treated early that would definitely have been better than to be incarcerated at a later stage. Early testing and detection can lead to the provision of help and reduce the risk that a child will experience problems later:

Look, at a moment that one then could also treat it and one could see to it that this is not going to happen, then it does not matter whether they say it early that, yes, he will become aggressive later, because if the treatment works, then he will not become that. (J4)

In addition to these supporting arguments, participants are also worried about potential dangers and state that these have to be dealt with carefully. In their perspective, tests that aim at the identification of children who are at risk of developing behavioral problems because of some neurobiological features could involve direct interference with a child's body and therefore lead to disadvantages to the child's health and well-being. Moreover, such tests could lead to the more indirect danger of prejudice against children with positive test results:

If, for example, one has to cut in somebody in order to look whether there is something wrong or not, look then I would say one should not do that but one has to wait until the one is old and wise enough to decide for himself. (J4)

I would not find it to be wrong, but one may not give a prejudice due to the examinations. One may not have a judgment about a child of three or four years old because perhaps he has a high heartbeat or more adrenaline in his blood. (J3)

According to the participants, for both of these reasons, testing should occur under specific conditions only. To avoid prejudice and stigmatization, it may for example be required to keep test results confidential and make these available to well-defined persons only. Parents, therapists and possibly teachers are mentioned as persons who should have access, whereas one's friends or one's sports-club coach, for example, should not be informed about a child's risk-status. The latter are considered particularly prone to stigmatize such children:

Then one can have a disadvantage. Or if one joins a football team and then, for example, the trainer knows that you how to say, that you have something, yes that you know that later you will become criminal and if then perhaps something gets stolen, that then this boy will be accused, do you get it? That could happen. (J13)

Furthermore, there are also worries about the quality of future tests. Tests have to exclude the possibility that a child is identified wrongly (so-called false positives). This is important because of the danger of stigmatization that potentially comes along with a positive test result. This is particularly serious in case of a false positive result:

If it then will not be like that, you will have given someone a label that he does not deserve. That is the same as convicting someone innocent. [...] But as long as these mistakes are not made and a treatment really works, I would say for sure that the children then may be examined. But not if one knows that mistakes will be made. Yes, there really has to be 105% certainty. (J4)

Next to these (conditionally) affirmative arguments, other participants categorically oppose early detection, because they see it as unacceptable almost by definition. First, some consider it simply impossible that one could ever identify young children who will commit future crimes. Partly, this general doubt is linked to the reasons they report for the crime. For example, if one commits a robbery because one needs money, nobody could have known this while the later robber was still a young child. Further, it has been argued that children still have to be raised and educated and will grow into a particular culture. One's upbringing, cultural background and later friends will make a difference. Consequently, it is impossible to draw conclusions about later criminal behavior of specific children who have not yet been fully raised and grown up:

As a child everybody is the same. Yes, it really depends on how your parents are [...] and if that all goes well and if then he is grown up, still he has a risk that he, yes, it depends on which friends or name it, that go together with him. But some things will also make him stronger. As regards education, that then he still is able to bear that. (J12)

Second, for some the aforementioned danger of stigmatization and labeling is a decisive reason to categorically reject all forms of early detection of children at-risk. Once identified, labeling cannot be avoided, because it will also happen unconsciously and because people will automatically tend to perceive such children selectively with a strong emphasis on their risk-status:

Maybe not discrimination, but selective perception. This will happen unconsciously. When one walks along the street and sees somebody else, you will pigeon-hole him anyway, that happens unconsciously. (J1)

That people are, let's say, that there are prejudices about these people [...], because they have been examined and have it written on a paper. (J6)

A final reason provided to reject early identification concerns the very procedure of the testing itself. It is considered to disturb a child's natural development and simply not good for children, if they have to undergo whatever tests:

One has to let a human just have his own development and one may not trouble little children, or in any case examine them and according to me trouble them then, because of what sometimes maybe could happen. (J9)

4. Discussion

In this study we interviewed 13 juveniles in a juvenile justice institution and tried to elicit their views on the genomics and neurobiology of antisocial behavior and possible consequences for future prevention and treatment. Although not all eligible juveniles took part in the study, we experienced a general willingness among juveniles to participate. Those who took part in the study were not only willing to talk, they appeared also rather capable to think things through and to express their points of view. Understandably, they had limited previous knowledge about this kind of research and almost all their knowledge about the genomics and neurobiology of antisocial behavior was the result of the information provided by the interviewer. Nonetheless, it was possible to talk about the possible consequences, to investigate their views of some inherent assumptions of this kind of approach and to identify their interests.

Our participants came up with a large variety of views, attitudes, arguments and reasons. We encountered affirmative attitudes as well as clear rejections with regard to almost each topic discussed: forensic psychiatric treatment, preventive treatment, psychopharmacology, early detection and identification. Next to these two extremes, the attitude of many participants can be characterized as either being connected to specific conditions under which, for example, a preventive treatment would be offered or to possible negative side-effects. To examine whether it is possible to differentiate between attitudinal styles among juveniles in detention and whether such styles correlate to relevant demographic factors should be a task for further research. This research should comprise a much larger sample, include girls as well as boys, be representative with regard to educational level, ethnicity and severity as well as kind (violent versus non-violent) of offense. The important heuristic that our study reveals, however, consists in the suggestion that juveniles in detention are a largely heterogeneous group with different, and sometimes opposing, views and attitudes. THE opinion of THE juvenile delinquent about antisocial behavior, neurobiology and prevention does not exist. An individualized understanding and interpretation may therefore be more adequate than a group-based approach. In the following, affirmative and dismissive attitudes will be discussed subsequently.

Biological approaches assume that with regard to antisocial behavior it is possible to draw a line between affected and unaffected individuals. As our findings show, however, for our participants it is not

self-evident to accept the medicalization of their behavior (Conrad, 2007). Instead, biologically based understandings are considered unnecessary, impossible, or even undesirable. This conclusion is based on three corresponding observations. First, although part of the participants report to have received some psychiatric diagnosis – e.g., (signs of) borderline personality disorder, narcissism, lack of emotionality, social and emotional deficits – they hardly connect this to their actual behavior or consider it to be of influence on their crime. This is not because they would reject their diagnosis, but for them a diagnosis is rather meaningless. Instead, juveniles come up with social and psychological explanations: They grew up in a bad neighborhood, had the wrong friends, experienced a lack of money, or consumed large quantities of alcohol and soft-drugs. In addition, a personal choice, albeit a bad one, is considered to play a decisive role in their criminal acts. Together, these conditions constitute a sufficient explanation and a further biological or medical explanation appears unnecessary to them. Second, participants do not consider themselves significantly different from people without contacts with the criminal justice system. It is considered unlikely that their brain or other biomarkers (by which they mean their heartbeat or their levels of adrenaline, cortisol, or testosterone) would be different from those of other people, or, at least, that any difference could be significant. Therefore, they are rather suspicious about the mere possibility that a physical examination could ever uncover any significant information. Provided that data are available that, at least, some subgroups of juvenile delinquents are exactly characterized by a deviant cortisol response (Popma, Doreleijers, et al., 2007; Popma, Vermeiren, et al., 2007), it may be important to well inform juveniles about their own condition in order to facilitate autonomous decision-making. Third, some participants expect that if the cause of antisocial behavior is looked for in the body, tests that examine a person's condition or treatments intended to change that condition may harm the body itself. Invasions of bodily integrity, however, are experienced as much more serious interferences than, for example, an interview with a psychologist. Therefore, the medicalization of antisocial behavior is considered undesirable. Biologically informed interventions may obviously not necessarily be invasive. However, in so far as invasive methods, such as deep brain stimulation for antisocial personality disorder, are considered (e.g., Brain Stimulant Blog, 2008), these fears must be recognized and taken into account.

Furthermore, biological approaches seem to support the so-called prevention-logic, according to which (early) prevention and treatment are by definition valuable and as such will lead to overall improvement. Our findings, however, suggest that this assumption is not self-evident. Participants agree only partly and instead also express serious doubts concerning firstly, the desirability of the very goals of prevention and intervention and secondly, potential negative side-effects, harms and drawbacks.

Regarding the first doubt, a close link has been established in research between personal features such as aggressiveness or impulsivity (Frick & Petittclerc, 2009; Lane & Cherek, 2000) and antisocial behavior. Yet, according to our participants these features could also have positive aspects, both personally (e.g., gaining social status among peers), and in a broader social perspective (e.g., assertiveness and ability to achieve one's goals, including those generally accepted as socially desirable like becoming a sports champion). As a consequence, prevention and treatment that aim at the reduction of aggression, or that modify fearlessness, may not only preclude antisocial behaviors, but also inhibit these positive aspects. This may imply that the criteria of preventive effectiveness may be too narrow and overlook adjacent issues of value. To a certain extent, this doubt can be confirmed by the literature about fearlessness in the general population. For example, bomb-disposal operators decorated for their outstanding courage have been shown to possess low cardiac activity similar to those psycho-physiological features considered characteristic for people exhibiting antisocial behavior (O'Connor, Hallam, & Rachman, 1985).

'Medicalisation' of (too) low cardiac activity may not only reduce anti-social behavior, but also foreclose some types of courageous behaviors. Obviously, taking seriously concerns about the goals of prevention efforts does not imply respect for criminal or violent lifestyles. However, it does imply the recognition that the goals of preventive interventions and treatments are not self-evident and need specification. Increasing scientific knowledge about the prevention of antisocial behavior alone is insufficient. It has to be preceded and accompanied by a continuous normative debate about which specific behaviors to prevent, why, how and in whom.

With regard to the second doubt two issues arise. There is considerable concern that children identified as 'at risk' for developing antisocial behavior will become labeled and be stigmatized. This is particularly problematic in case children would be wrongly identified as being at-risk. Although demands for absolute certainty may be unrealistic and entail excessive expectations about the possibilities of predictive testing, both the dangers of stigmatization and of false positives (and false negatives) are real and it is important to acknowledge that participants mention these issues and consider them problematic. Labeling and stigmatization raise ethical concern because they are against the interests of the child. Moreover, we note that these concerns are also in accord with those expressed in the academic literature (Blank, 2007; Dinwiddie, 2000; Phelan, 2005; Singh & Rose, 2009). However they are not specific for genomics and neurobiology. In principle, these concerns also apply to early interventions based on traditional social scientific and psychological research (Burnett, 2007; Gatti, 1998). The labeling effect of a heart rate or cortisol measure may be as extensive as that of a questionnaire about personal issues. From an ethical point of view it is more important to determine how to deal responsibly with possible risks of early detection and prevention than asking whether this is based on a social scientific, a psychological, a biological or a mixed approach (Horstkötter, Berghmans, & De Wert, 2011).

Participants are not only anxious about future developments, some also pin significant hopes on them. Current treatments are perceived as helpful and there is trust both in professionals and in future developments, biological or otherwise. The expectation of one participant that professionals can determine what the cause of problems exactly is because they are particularly able to take specific circumstances of juveniles into account, is a clear example of this. Furthermore, participants see themselves and others in their situation as unique and possessing individually unique problems. This perception of the sample of juveniles with antisocial behavior concurs with our observation that the views and attitudes of our participants are heterogeneous and that they constitute a diverse group. It also corresponds with current ideas about individual diagnosis and the development of individualized treatments (van Goozen & Fairchild, 2008).

Mainly, the attitudes and expectations expressed are related to the participants' own role and position. Sometimes, however, also parents are mentioned. The ideal of parental autonomy and authority to make decisions for their children is defended; parents are also assigned a role as participants in intervention measures intended to reduce antisocial behavior among children and juveniles. It is important to acknowledge that in principle participants value the parent-child relationship and present themselves loyal towards parents. This impression has been reported previously with regard to children in child psychiatry (Batten, 1996). In line with our participants' ideas, research has shown previously that parent management training is effective in the reduction of antisocial behavior in youth (Ogden & Hagen, 2008).

Our research has a number of limitations. Our participants had hardly any previous factual knowledge about genomics and neurobiology research concerning antisocial behavior. Their views and attitudes may therefore be the result of ad-hoc impulses rather than of serious deliberation. Their opinions may further be formed by misunderstandings, exaggerated fantasies or simplifications regarding the intentions or

possibilities of these scientific approaches. Moreover, their deprived social and family backgrounds may be responsible for a frame of reference that allows for the acceptance of what actually constitutes serious problems. This may hamper critical reflection. These concerns may be justified, that is, it may be correct that there are misunderstandings, misrepresentations, or simplifications. However, since it was our very aim to present the perspective of this specific stakeholder group, these findings are rather a result than a limitation of our study. Furthermore, it is a characteristic of all stakeholder research that the perspective provided is biased by the specific features of the respective groups. In order to obtain an overall perspective that is as valid as possible, it is required to conduct research among multiple stakeholders. Such further research should comprise parents of children at-risk and of those with current behavioral problems, professionals working with antisocial juveniles, and scientists investigating the biological, social, and psychological features of antisocial behavior. Moreover, valuable information could be garnered by separately investigating juveniles with specific mental disorders and by including females as well as males.

Another potential limitation of our pilot study is the comparatively small number of participants. We are aware that more participants may have come up with an even greater number of reasons why to accept, to reject, or to make one's attitude depending on specific conditions. However, we consider it unlikely that a further fourth general attitude would result from a larger sample size. In this sense, the three main patterns of thinking identified in this study indicate that saturation has been achieved. Moreover, many relevant arguments are mentioned, which can be confirmed partly by similar concerns expressed in current scientific literature and which partly add to this literature. Rather than a limitation, we consider it an interesting finding that great diversity in participants' views can be found among such a comparatively small sample. Therewith, the goal of this pilot study has been achieved and the sample size is considered sufficient.

5. Conclusion

Current insights about genomic and neurobiological features of children at risk for developing antisocial behavior trigger great expectations for the development of new forms of early detection, prevention, and treatment. In this pilot study we explored the views and attitudes of juvenile delinquents about these new approaches and their potential consequences. We were able to identify three different patterns of thinking about these matters. Participants express clearly positive and agreeing as well as negative and rejecting attitudes, in addition there is a group that adopts what may be called a 'perhaps-attitude' making their acceptance depending on a variety of specific conditions. For each of these three patterns, a variety of reasons is provided. Those who welcome the new developments do so, because they trust the efforts of professionals and favor whatever may increase the success of these efforts. Biologically informed measures, however, are not considered to take up a special place, enhance trust or trigger extra hopes. This is different with regard to the negative arguments. Here aspects considered specific for a biologically informed approach come to the forefront. Reluctant participants associate biological approaches, for example, with psychopharmacological treatment or attacks to their bodily integrity and therefore reject them. Further arguments concern the intended aims of prevention and treatment, the predictive value of early identification efforts and the danger of labeling and stigmatization. These latter concerns, again, seem to apply also to non-biological measurements. Therefore, we want to argue that although the views and attitudes of juvenile delinquents were elicited by means of questions concerning current developments in genomics and neurobiology, their hopes and expectations and their worries and concerns are, at least partly, also applicable to prevention and intervention measures informed

by sociological and psychological research. The insights of this study are mainly of heuristic value, allowing for the development of well-informed subsequent research that could further enhance our understanding of the views and attitudes of juvenile delinquents.

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