

Giftedness and autism: From differential diagnosis to needs-based approach¹

Introduction

Some intellectually gifted children and adolescents are underachieving learners, who behave in a peculiar way and may suffer from social isolation. Despite their intellectual talents, these children do have special educational needs. Some psychologists tend to stigmatize these students quite quickly as autistic. Others warn us not to confuse such gifted characteristics with autistic behaviour. The twice-exceptionality of giftedness (GFT) and autism spectrum disorders (ASD) is a complex phenomenon. Unfortunately, dual and differential misdiagnoses often occur. Diagnostic confusion among psychologists and other professionals is due to the camouflaging effect of some features of intellectual giftedness, which at first glance appear to be similar to symptoms of ASD, and vice versa. How can we avoid this labelling dilemma? A solution lies in assessing the 'grey zone' between giftedness with and without ASD. This grey zone is the key concept of the theory of Dimensional Discrepancies. This model, developed in 2003 and theoretically substantiated later on (6,7,8,9), was recently integrated with the three prevailing cognitive causal theories of autism: Theory of mind (TOM), Executive dysfunction (EDF) and Weak central coherence (WCC).

In this paper, Agnes Burger-Veltmeijer introduces another way of thinking in order to help professionals to discriminate between the qualitative differences of gifted-like and autism-like traits. It encourages professionals in education and psychology to refocus from 'classification diagnosis' to 'needs-based approach'. This process will be illustrated by means of the DD-checklist draft design and short film shots.

Autism spectrum disorders (ASD)

ASD refers to disorders on the autistic continuum, that stretches from the severe diagnosis Autism on one side, to the 'lesser variants', like PDD-NOS and Asperger's Disorder (1) on the other side. We agree with Serra et al (19) that '... 'lesser' only refers to the severity or the amount of symptoms, and not to the consequences of these symptoms for daily functioning.' In fact, normal to highly intellectual children and adults may suffer very much from their autistic impairments, as is clearly expressed by some autistic authors. For example Marc Segar (18), a biochemist, who wrote a survival guide for people with Asperger's syndrome (AS). Unfortunately, it turned out he himself was unable to cope with life.

ASD is characterized by the following triad of (mutually related) impairments:

1. reciprocal social interaction (like no friends, many conflicts, being bullied),
2. verbal and non-verbal communication (like echolalia, talking but not communicating, no eye for facial mimicry, body posture, loudness of voice et cetera),
3. imagination (like no fantasy play, no creative thinking, incapability to imagine what emotions, thoughts or intentions another person might have).

These go together with a marked preference for a rigid, restricted and repetitive pattern of activities and interests (21), like strictly sticking to routines and rules. Moreover, several non-specific characteristics may exist. For instance sudden temper tantrums, fragmented information processing, motor problems or sensory sensitivity.

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According to contemporary research the criteria used for an autistic spectrum disorder diagnosis are dimensional (continuous), not categorical (yes/no) (e.g. 3,4,14,17). There is no independent biologic or psychological test to either confirm or refute this diagnosis.

Prevailing cognitive theories

Autism involves cognitive deficits (2), including: Deficits in *Theory of Mind* (ToM), which includes the capacity to understand another persons thoughts, feelings and intentions, and the capacity to act appropriately on this knowledge, in the specific context in which the interaction takes place. This phenomenon is also called ‘social intelligence’ or ‘empathising’ (2,3). Because ToM doesn’t explain all features of ASD, especially the stereotyped repetitive behaviours, two more cognitive theories were developed:

Frith and Happé (11) introduced the theory of *Weak Central Coherence* (WCC). This refers to deficits in conceptual processing, the extreme focus on details and the concomitant incapability to overlook the whole picture, in a literal and figurative way of speaking. This brings about a fragmented way of cognitive and social information processing.

Last but not least, the theory of *Executive Dysfunction* (EDF). Executive Function (EF) is an umbrella term for different interrelated cognitive skills. The mental control processes, which enable self-control in novel and ambiguous situations (13). EDF helps to explain the weak social skills, behavioural inflexibility and poor learning strategies of (gifted) children with ASD. To our experience, executive dysfunction might be one of the most important (hidden) causes of sudden unexpected underachievement when gifted children of about 12 years old change from primary to secondary school. Therefore, this concept will get extra attention:

Executive functions

The three executive functions strongly associated with ASD (13) are: 1. *Cognitive flexibility*, the capability to readjust responses and behaviour when the situation alters, and to think of new and adequate strategies. 2. *Inhibition*, the repression of irrelevant information, in order to prevent these stimuli from interfering with future goals. 3. *Working memory* enables individuals to keep information in short term memory, in order to be able to deal with intermediate processes in a task. For instance, it allows children to take and retain consecutive steps in solving an arithmetic or communication problem. All these executive functions enable individuals to organize and plan their social as well as their intellectual actions. In education and clinical settings, we see intellectually gifted children with learning problems, caused by failure of these functions. This doesn’t make them necessarily ASD, but it puts the cause of underachievement in another perspective, as will be explained below.

Emotional versus neurobiological causes

Learning and social problems of gifted children, like underachievement and social isolation, can have different causes, as is shown in table 1. For instance, underachievement at school, of gifted child without ASD, mainly has an emotional cause, like a lack of motivation, due to little intellectual challenge. However, underachievement of a gifted child with ASD mainly has a neurobiological cause, like WCC and/or EDF. The same goes for problems of social isolation: in case of a gifted child without ASD, the social problem mainly has an emotional cause, like low tolerance of slow thinkers or shortage of interest peers. However, social isolation in case of giftedness plus ASD mainly has a neurobiological cause, that is lack of empathy, of ToM. These different causes are not always clearly differentiated, every gifted child with symptoms of ASD has his own pattern. But before starting a therapy or special educational programme, it is important to assess what causes lay underneath the problems of underachievement and social interaction, in order to get a clear picture of the special educational and psychological needs of any individual child. This is also shown in table 1.

table 1

© ABV	Problem: learning(strategies) / e.g. underachievement	Problem: reciprocal social interaction / e.g. social isolation
GFT emotional cause	Cause: lack of motivation, no intellectual challeng-e, never learned how to learn or fail. Need: intellectual challenge, compacting, enrichment, acceleration, train learning strategies.	Cause: shortage of interest peers; lack of tolerance of slow thinkers. Need: provide interest peers / like-minded friends; train social skills by appeal to empathy.
ASD neurobio- logical cause	Cause: fragmented/detailed thinking (WCC), attention / organizing disorder (EDF) Need: help structure: diary planning, studying, distinguish important and unimportant details; buddy	Cause: lack of empathy, ToM Need: special training of social skills, by appeal to 'counting costs and benefits'

Misdiagnoses of Giftedness plus Autism spectrum disorders (GFT+ASD)

A gifted child with ASD has two exceptionalities. One is giftedness, which is a significant deviation from normal intelligence. Secondly, ASD is a significant exception to the average way of (social) functioning. The dual exceptionality 'GFT plus ASD' is a complex phenomenon that is sometimes difficult to diagnose properly because both exceptionalities have *similar behavioural characteristics*, which are summed up in table 2. Correct dual or differentiating diagnoses are also complex because the GFT-features and ASD-symptoms might mutually *camouflage and distort* one another. The following quote of Gallagher and Gallagher (12) illustrates this camouflaging complexity: 'Consider combining the social inattention, motor clumsiness, and high verbal skill of Asperger's Syndrome with such traits as independent thinking, constant questioning, and heightened emotional sensitivity (...). It is the perfect formula for a social pariah.'

Moreover, there is no such thing as a clear-cut line between giftedness with ASD and giftedness without ASD. These two conditions are situated at both ends of a *continuum*. This corresponds to the currently accepted notion that the social skills and cognitive styles of autism appear on a continuum (2,4,14,17). And above all that, correct dual labelling is also hindered by *one-sided knowledge* and experience of many professionals (16).

These interrelated mechanisms cause the following multiple types of misdiagnoses: *Differential misdiagnoses*, like one-sided attribution of deficits to GFT or one-sided attribution of deficits to ASD. And *dual misdiagnoses*, that is incorrect attribution of deficits to both, ASD and GFT.

table 2



Similar characteristics of GFT and ASD/GFT+ASD

(sources: Cash, 1999; Gallagher & Gallagher, 2002; Little, 2002; Neihart, 2000; Webb et al., 2005)

mentioned by all authors (clustered):

- difficulties in social interaction, e.g.:
 - pay no attention to the other's perspective or viewpoint,
 - egocentric,
 - monopolize conversations,
 - incessantly talking or asking questions.
- advanced memory and cognition, extensive knowledge base.
- intensity of focus, absorbing interests.
- social isolation, no friends, tendency towards introversion.
- precocity of language and speech patterns, verbal fluency, large vocabulary.

mentioned by some authors:

- sensory sensitivity, hypersensitivity to stimuli (Cash; Neihart; Little; Webb).
- intense need for stimulation (Cash).
- special sense of humor (Neihart; Gallagher&Gallagher).
- visual thinking (Cash).
- difficulties conforming to the thinking of others (Cash)
- argumentative (Cash).
- stubborn (Cash).
- uncooperative (Cash).
- resistant to teacher domination (Cash).
- perfectionist personalities (Cash).
- extraordinary levels of performance in a certain area, together with average range in other areas (Neihart).
- uneven development, particularly when cognitive development is compared to social and affective development at a young age (Neihart; Webb).
- concerned with fairness and justice (Webb).

How to avoid the diagnosis dilemma

The objective of this paper is to show a solution to this diagnosis dilemma, the decision whether a particular child is Gifted or Autistic or both. The solution is in fact a logical one: Try to unravel the camouflage, by dividing the similar behavioural characteristics into different behavioural manifestations: one that belongs to GFT plus ASD, and one that belongs to GFT without ASD. Because at a closer look, when a psychologist observes a child not only in a clinical or educational diagnostic room, but also in everyday life situations like at home, at the playground and in the classroom, he will become aware that similar characteristics show different manifestations. This will be further explained in the next three paragraphs, by means of the DD-Model, the extended DD-Model and the concept of the DD-Checklist.

DD-Model I

The preliminary design of the Dimensional Discrepancy Model GFT+ASD was developed in 2003 and improved and theoretically grounded in 2005 (6,7,8,9). Figure 1 illustrates this DD-Model I, which consists of two continuous lines, which are base lines of normal curves. At the top the line of the dimension 'cognitive intelligence' and underneath the line of the dimension 'social intelligence'.

Giftedness in the cognitive area does not imply giftedness in the area of social intelligence, because it can be assumed that both dimensions are independent of each other (6).

Our target group of individuals with GFT+ASD is located on the right side of the line of cognitive intelligence (above 2 sd's from the middle, IQ > 130, the gifted area) and at the same time on the left side of the line of social intelligence (below 2sd's from the middle, the retarded or ASD area). In case of an individual with IQ=130, the left arrow accentuates a theoretical discrepancy between the level of cognitive and social intelligence of 4 sd's. The right arrow points from the cognitive gifted area to the 'average level' of social intelligence. It

shows, in case of another person with IQ=130, a discrepancy of 2 sd's between level of cognitive and social intelligence. The DD-model illustrates the idea that gifted individuals, contrary to averagely intelligent individuals, might already have a disharmonious development (and might suffer from it) if social intelligence resembles the average of the normal population. Therefore, in this model ASD is not defined as an absolute standard for everybody. Instead, the definition is a relative one: ASD is defined in relation to any individual's level of cognitive intelligence, his IQ.

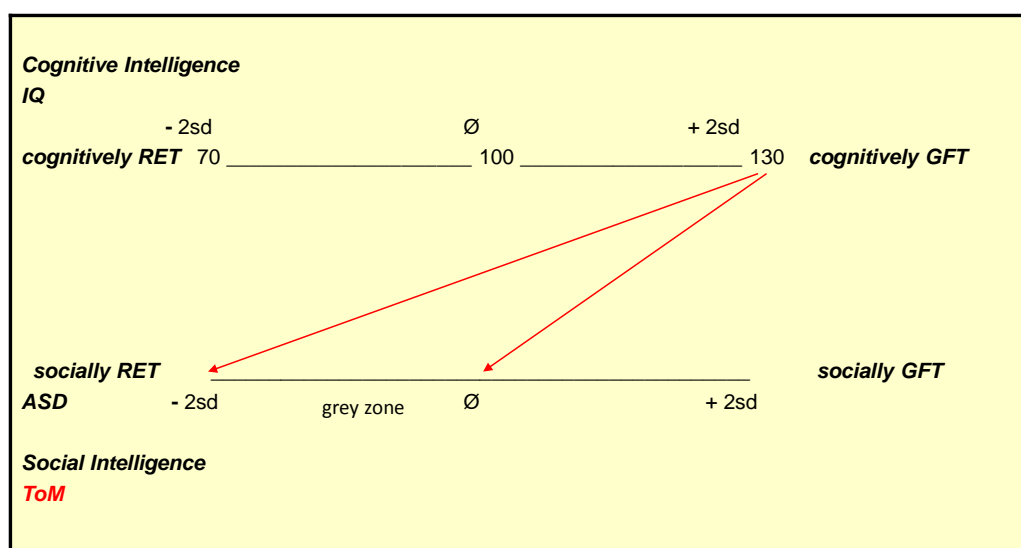
In between the two arrow points lies the transitional area of the *grey zone*. In this grey zone are situated those individuals, who have a cognitive IQ in the gifted area, and at the same time a social intelligence level less than the average area, but not low enough to be called ASD, considering the official criteria of the DSM-IV, the Diagnostic and statistical manual of mental disorders (1).

However, these gifted children and adults may suffer from severe problems because their social capabilities do not match their cognitive intellectual capabilities. Therefore, they might be handicapped in their social life. The extent to which a child really suffers from this handicap depends on its personality and the demands of the social and occupational environment it lives in. In the next paragraph an extended version of the model will be introduced, DD Model II.

figure 1



DIMENSIONAL DISCREPANCY MODEL GFT+ASD
(DD-Model)



Extended Dimensional Discrepancy Model GFT+ASD (DD Model II)

Figure 2 shows the integration of the concept of the grey zone and the three cognitive causal theories of ASD. At the top you see the model of the previous paragraph, to which the dimensions of Executive functioning and Central coherence are added. In this extended model, DD-Model II, the right light blue arrow on the EF line shows that someone with a very high cognitive intelligence, but whose Executive Functioning is average and therefore relatively low compared to the IQ, has a large discrepancy between his IQ and the level of EF.

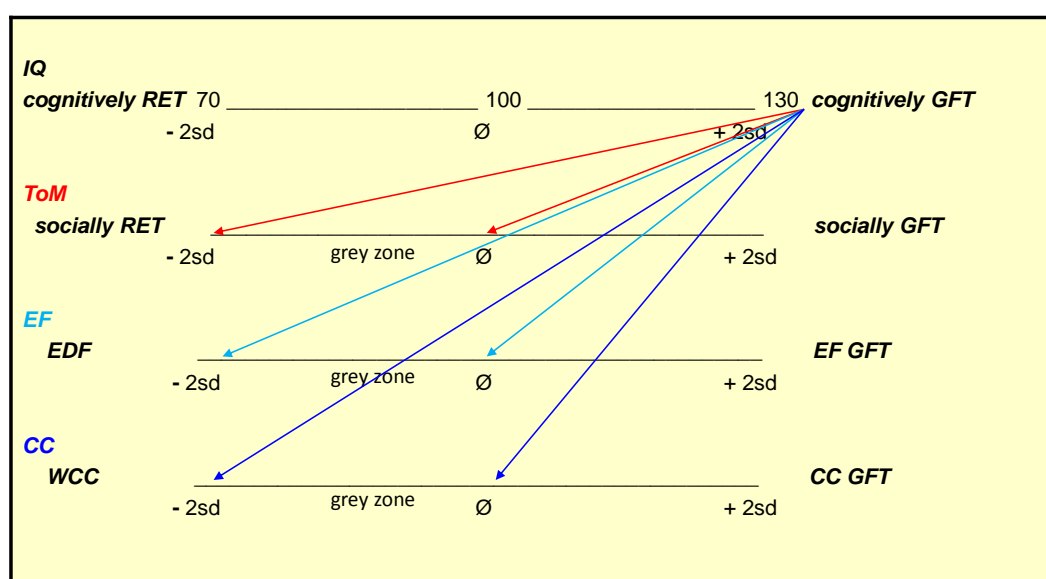
On the left of the left light blue arrow you see the area of absolute executive dysfunction (EDF). In between the two light blue arrow points lies the area of the grey zone, of relative disability. The same goes for the dimension of Central coherence, it is the grey zone in between the two dark blue arrows.

Each dimension has its own grey zone. These areas are accentuated in the colour grey, shaded from white (the no problem area) to dark grey (the absolute deficit area). Every gifted person, with IQ of 130 or more, can be placed somewhere on these dimensions.

figure 2



DIMENSIONAL DISCREPANCY MODEL GFT+ASD II
(DD-Model II)



The core parts of DD-Model II are the three grey zones. These are the transitional areas of relative impairments between giftedness with and without ASD. Quite a few gifted children we saw in educational and clinical practice, those with communication impairments and/or learning problems, are situated in one or more of these grey zones. They sometimes face serious handicaps in coping with the demands of education and everyday life. Their problems are initiated partly by neurobiological causes and partly by emotional causes. These children are not helped by 'simply' joining a special programme for gifted children. They are also in need of an ASD-like structured educational programme and psychological treatment (see table 1), adjusted to their individual needs. So, though they do not (seem to) show enough characteristics of ASD to be diagnosed as such, they may be in need of ASD-like facilities to some extent.

The question is whether such an intellectually gifted child who is situated in one, two or three grey zones, is in need of an ASD classification. This will not always be necessary. For, instead of focusing on the labelling question: 'Is this gifted child suffering from ASD or is he not?', we should pay much more attention to the assessment question: 'What are the special educational and psychological needs of this gifted child with ASD-like symptoms?', or vice versa: 'What are the needs of this ASD-child with gifted features?' In other words, a shift has

to take place from ‘labelling diagnosis’ to ‘needs-based assessment’. To be able to do so, the specific symptoms and characteristics of children in the grey zone have to become explicit. In other words, the ‘grey zone’ area has to be made operational. This is done by means of the so called ‘DD-checklist’, a draft design that is illustrated in figure 3.

DD checklist

The idea of the DD-checklist helps to unravel the above mentioned similar and camouflaged characteristics into an observable gifted-like manifestation versus an ASD-like manifestation. The DD-checklist can be filled in after integral assessment, including an IQ-test, learning tests and (neuro)psychological tests. Moreover, to be able to fill it in properly, it is a prerequisite that the psychologist observes the child in everyday situations, for instance at school, in the playground and at home with the family. This is important, because the ASD symptoms, such as inadequate social interaction, cannot be properly observed in a one-to-one testing situation, in case of people with normal to high intelligences. This is, because these children do indeed have knowledge about emotions, but they do not know how to apply them in less structured everyday real life situations, which are much more difficult to control by cognition (5).

The observation data, together with quantitative and qualitative data from the integral individual assessment, including parental and teacher’s interviews, are all needed to be able to fill in the DD-Checklist. This goes as follows.

Based on the above mentioned information, the psychologist decides per similarity (that is, per item) whether the child’s behaviour tends towards the manifestation of giftedness without ASD (GFT-ASD, in column 5), or more towards the manifestation of giftedness plus ASD (GFT+ASD, column 1). Both manifestations are ends of a dimensional continuum. Then he decides to what extent the behaviour is similar to the chosen manifestation: column 1 and 5 mean ‘*very much*’, column 2 and 4 mean ‘*obvious but not extreme*’, column 3 means that the behaviour has *traits of both* manifestation sides. Then the psychologist ticks the proper column and moves on to the next item.

In column 7, the psychologist can put advice remarks per item. For instance, when a child has a fragmented learning strategy of merely memorizing details (see 5th item), the advice might be to teach him how to discriminate between important and unimportant details and how to see the wood for the trees. Because, although it is nice to have a good memory for details, it might become a handicap if a child’s whole life is dedicated to that.

If for a specific item no decision can be made yet, more information has to be collected. In that case, column 6 can be ticked off. After the complete list is filled in, a profile can be made, which can be integrated in the total needs-based approach.

The items are, more or less, divided into their dominant causes ToM, EDF or WCC. The text colours correspond to the colours of the arrows in DD model II (figure 2). Per individual child, different profiles are possible. If a child scores mainly in column 1, an ASD-diagnosis might be necessary.

Although the DD list is still under construction, its main idea can already be used by psychologists (in collaboration with teachers). The idea of the DD-checklist might help us to change our way of thinking from focus on diagnosis to focus on educational and psychological needs.

Conclusion

In this paper the theory of the DD-Model and the ‘grey zone’ have been integrated with the three predominantly cognitive causal theories of autism: The dimensions Theory of mind, Executive dysfunction and Weak central coherence. By means of this theory of Dimensional

Discrepancies, the dilemma of dual and differential misdiagnoses, in case of the combination of giftedness and autism spectrum disorders, can be tackled.

That is, if the psychologist, the diagnostician, is prepared to do integral assessment, including appropriate (neuro)psychological tests, an IQ-test, learning tests and observations in everyday life situations, while focusing on the following two principles: 1. Decide per learning- or social behavioural problem, whether the underlying cause is merely emotional or merely neuropsychological by nature. 2. Do not just focus on differential or dual questions like ‘gifted, or ASD or both?’, but try to focus on the individual educational and psychological needs of the particular child. The principle of the grey zones in DD-Model II and in the DD-Checklist may be of help. In these grey zones are situated those gifted children who may be in need of ASD-like facilities to some extent, although they do not (seem to) show enough characteristics of ASD to be diagnosed as such.

figure 3

© ABV		DRAFT DESIGN-DD-CHECKLIST (5 example items)						
similar characteristics	≠	manifestation in case of GFT plus ASD	grey zone			manifestation in case of GFT without ASD	> Info	needs – based advice
0		1	2	3	4	5	6	7
<i>social interaction and communication :</i>								
social isolation, no friends interaction problems with peers		lack of Theory of Mind, socially inept; lack of empathy; unskilled with Age Mates, and unaware of how to make friends				shortage of ‘interest peers’ or ‘like-minded’ friends; lack of tolerance; independent of Age Mates, but knows how to make friends		
aware of being different		know they are different, poor awareness of why; unaware of another’s perspective and viewpoint				know they are different, can reason why; aware of another’s perspective and viewpoint		
precocious language, speech patterns highly verbal, fluent speech		delayed echolalia, monotonous, repetitive, pedantic, seamless speech				original, creative speech, normal, but may have language of older child		
<i>restricted, repetitive behaviour, and interests :</i>								
absorbing interests		one topic of interest, cannot shift attention to other things				interested in many things, passionate fascination, can be distracted from it		
advanced memory and knowledge		advanced memorization, fragmented learning, preoccupation with details; enjoys ‘rote’ exercises, (obsessively) memorize everything,				advanced understanding, holistic meaningful learning; more selective, filter out, discard certain sources of information		
0		1	2	3	4	5	6	7

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