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Psicoterapia Cognitivo-Comportamental e Integrativa

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Dissertação orientada pelo Professor Doutor João Moreira

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Preâmbulo

A presente Dissertação foi realizada no formato recomendado pela revista "Journal of Autism and Developmental Disorders" de modo a preencher os requisitos propostos pela mesma, com o objetivo de submeter o presente projeto científico para possível publicação.

Abstract

Background: Little research attention has been extended to deficits in social relationships found in persons with Autism Spectrum Disorder (ASD). The present work addresses this gap, employing a new Portuguese version of the Friendship Quotient (FQ) together with other instruments.

Method: After translation and back-translation, the FQ was, together with the Autism Quotient (AQ), the Empathy Quotient (EQ), and the Systematization Quotient (SQ) questionnaires, administered to two samples of participants. The general population sample was composed of 498 individuals, of which 13 claimed to have an ASD diagnosis and 28 believed they would merit one. The clinical sample comprised 33 individuals with a Type 1 ASD diagnosis without major linguistic or intellectual impairment, with diagnoses certified by the institutions from which they were recruited. This sample responded to the questionnaires on paper, while the general population sample responded online.

Results: Factor analyses identified two possible models for the FQ, with two (Motivation for Contact and Yielding) and five factors (Flexibility, Valuation of the Other, Physical Proximity, Empathy, Friend Role). One factor was found for the AQ, three for the EQ (Social Perceptiveness, Care/Altruism, Self-Centeredness/Insensitivity) and three for the SQ (Curiosity for Origin/Creation, Curiosity for Functioning, Cognitive Difficulties/Lack of Interest). Cronbach alphas for the derived scales varied between .29 and .86. A moderate correlation was found between the FQ and the AQ. The FQ was most strongly related to the EQ, while the SQ provided the weakest correlations. Results also show that all the instruments employed can discriminate between a normal and an ASD population, the most important source of discrimination being the AQ, followed by the FQ.

Conclusion: Results indicate that the FQ and other instruments employed, with the factor subscales proposed, can provide reliable and valid data in ASD populations, opening new avenues for diagnosis, clinical assessment and research.

Keywords: Autism spectrum disorders (ASD), Friendship**,** Psychological Assessment**,** Empathy, Systematization.

Resumo

Introdução: O presente estudo procurou suprir a escassez de investigação sobre os défices nas relações sociais de pessoas com Perturbação do Espetro do Autismo (PEA), utilizando uma nova versão Portuguesa do Questionário de Amizade (FQ) conjuntamente com outros instrumentos.

Método: Após a tradução e retroversão, o FQ foi administrado a duas amostras, juntamente com o Questionário de Autismo (AQ), o Questionário de Empatia (EQ) e o Questionário de Sistematização (SQ). A amostra da população geral era composta por 498 participantes, dos quais 13 indicaram ter um diagnóstico de PEA e 28 acreditavam poder ter um diagnóstico. A amostra clínica incluiu 33 participantes com diagnóstico de PEA tipo 1, sem comprometimento linguístico ou intelectual, com diagnósticos certificados pelas instituições onde foram recrutados. Esta amostra respondeu aos questionários em papel, a amostra da população geral respondeu online.

Resultados: A análise fatorial identificou dois modelos possíveis para o FQ, com dois (Motivação para o Contacto e Capacidade de Ceder) e cinco fatores (Flexibilidade, Valorização do Outro, Proximidade Física, Empatia, Papel de Amigo). Foi encontrado um fator para o AQ, três para o EQ (Perceção Social, Cuidado/Altruísmo, Egocentrismo/Insensibilidade) e três para o SQ (Curiosidade pela Origem/Criação, Curiosidade pelo Funcionamento, Dificuldades Cognitivas/Desinteresse). Os alfas de Cronbach variaram entre .29 e .86. Foi encontrada uma correlação moderada entre o AQ e o FQ, que está mais fortemente relacionado com o EQ. O SQ obteve as correlações mais fracas. Os resultados mostram que todos os instrumentos são capazes de discriminar entre populações com e sem diagnóstico de PEA, o mais eficaz o AQ, seguido pelo FQ.

Conclusão: Os resultados indicam que o FQ e os restantes instrumentos, com as subescalas fatoriais propostas, providenciam dados válidos e confiáveis na população com PEA, apresentando potencialidades no diagnóstico, avaliação e investigação.

Palavras chave: Perturbação do Espetro do Autismo (PEA), Amizade**,** Avaliação Psicológica**,** Empatia, Sistematização.

Resumo Alargado

Introdução: A Perturbação do Espetro do Autismo (PEA) manifesta-se através de défices persistentes na comunicação social e interação social em vários contextos, que se expressam através de dificuldades na reciprocidade socio-emocional, défices na comunicação não verbal e no desenvolvimento sociocognitivo, bem como na manutenção e compreensão das relações. Esta é uma perturbação associada a padrões restritos e repetitivos de comportamentos, interesses e atividades, manifestados por movimentos motores, uso de objetos ou fala repetitivos ou estereotipados, adesão inflexível a rotinas, rituais ou comportamentos não verbais padronizados, interesses altamente restritos e fixos, que são anormais na intensidade ou no foco, e hiper ou hiporeatividade a estímulos sensoriais, bem como interesses incomuns a aspetos sensoriais do ambiente (American Psychiatric Association, 2013).

As dificuldades dos indivíduos com PEA na interação social e relacional estão certamente ligadas às diversas insuficiências que apresentam na compreensão do estado emocional das pessoas que os rodeiam, com défices severos a nível da empatia. Por outro lado, os seus interesses restritos e repetitivos estão relacionados com uma visão sistemática do mundo, sendo que estes são pacientes que recorrem à sistematização como mecanismo de funcionamento. No entanto, apesar de esta ser uma área em que os indivíduos com PEA enfrentam diversas dificuldades, a amizade continua a ser um preditor muito forte do bem-estar desta população (Bauminger and Kasari, 2000; Locke et al., 2010; Mazurek, 2014). Através da compreensão de quais os fatores que têm impacto nas relações de amizade dos pacientes com PEA, será possível contribuir para o desenvolvimento de estratégias e instrumentos que permitam facilitar a sua interação nesse domínio, melhorando a sua qualidade de vida através da amizade. Dada a relevância teoricamente suportada das relações de amizade, torna-se imperativo compreender quais os mecanismos através dos quais os pacientes com PEA percecionam estas interações, e qual o significado que lhes atribuem.

Apesar deste conhecimento, pouca pesquisa foi realizada até à data sobre o significado da amizade em adultos com PEA sem comprometimento intelectual ou linguístico, com um nível de severidade 1. Este projeto procurou abordar esta questão, com especial atenção ao desenvolvimento de medidas, por meio da análise psicométrica de uma nova versão em português do Questionário de Amizade e da sua relação com variáveis como empatia, sistematização e traços de autismo.

Método: Após a tradução e retroversão do Questionário de Amizade (FQ), este foi administrado a duas amostras de participantes, juntamente com o Questionário de Autismo (AQ), que avaliou os traços de autismo, o Questionário de Empatia (EQ), que avaliou os traços de empatia e o Questionário de Sistematização (SQ), que avaliou o interesse dos participantes em sistemas. Todos estes instrumentos foram previamente validados em populações de língua inglesa (Baron-Cohen & Wheelwright, 2003; Baron-Cohen & Wheelwright, 2004; Baron-Cohen, Richler, Bisarya, Gurunathan & Wheelwright, 2003; Baron-Cohen, Wheelwright, Skinner, Martin & Chubley, 2001) mas, para as versões portuguesas, os dados psicométricos são escassos (Pestana, 2013; Rodrigues et al., 2010; Rodrigues et al., 2011).

A amostra do presente estudo incluiu 531 participantes. A idade média dos participantes foi de 35,92 anos, com desvio padrão de 12,81, variando entre 18 e 74 anos. A amostra global incluiu duas subamostras. A primeira subamostra foi composta por 33 participantes que foram diagnosticados com PEA. Esses participantes foram recrutados em instituições da região da Grande Lisboa que prestam apoio a pacientes com Perturbações do Neurodesenvolvimento e foram diagnosticados de acordo com os critérios das instituições. Esta subamostra respondeu aos questionários em papel.

A segunda subamostra incluiu 498 participantes recrutados on-line, principalmente em sites que abordam o tema da PEA. Destes participantes, 13 afirmaram ter diagnóstico de PEA. No entanto, dadas as circunstâncias da administração, é impossível garantir a qualidade do diagnóstico. Outros 28 participantes reportaram que não tinham um diagnóstico formal, sendo que acreditavam que tinham características de PEA, e 457 participantes não relataram diagnóstico ou características. Esta amostra respondeu aos questionários on-line.

Na amostra global, 74,8% dos participantes eram do sexo feminino e 25,2% do masculino. Enquanto que o grupo de participantes com diagnóstico garantido pela instituição era constituído maioritariamente por homens (84,8%), nos grupos que relataram ter um diagnóstico ou pensam que podem tê-lo, a maioria era de mulheres (61,5% afirmam ter diagnóstico e 64. 3% acham que podem ter um diagnóstico), assim como no grupo sem diagnóstico (80,1%). É importante notar que a percentagem de homens que afirmaram ter um diagnóstico confirmado ou suspeitado de PEA é superior à percentagem de homens na amostra global, indicando que a probabilidade é superior no sexo masculino.

Resultados: As análises fatoriais, realizadas para as duas amostras em conjunto, identificaram dois possíveis modelos fatoriais para o FQ, considerando dois fatores (Motivação para Contacto e Capacidade de Ceder) ou cinco fatores (Flexibilidade, Valorização do Outro, Proximidade Física, Empatia e Papel de Amigo). Foi encontrado um fator para o AQ, três para o EQ (Perceção Social, Cuidado/Altruísmo e Egocentrismo/Insensibilidade) e três para o SQ (Curiosidade pela Origem/Criação, Curiosidade pelo Funcionamento e Dificuldades Cognitivas/Desinteresse). Os alfas de Cronbach para as escalas derivadas variaram entre .29 e .86. As correlações mostraram uma correlação moderada entre o FQ e o AQ, confirmando que o FQ se relaciona significativamente com as características da PEA. O FQ está, no entanto, ainda mais fortemente relacionado com o EQ, e o SQ parece fornecer as correlações mais fracas com as outras escalas.

Foi ainda observado que existem fortes correlações entre o EQ e o AQ, principalmente no fator QE-SP, relativo à Percetividade Social (QE-SP), tendo sido ainda encontrada uma correlação particularmente relevante na amostra clínica entre a Motivação para o Contacto (QA-MC) e o Cuidado/Altruísmo (QE-C/A). Esta correlação é marcadamente mais forte do que as presentes nas restantes escalas dos mesmos instrumentos.

Considerando as fracas correlações do questionário SQ, os efeitos mais fortes observados indicam uma relação entre esta prova e o fator do EQ relativo ao Egocentrismo/Insensibilidade (QE-SC/I), levantando implicações teóricas e práticas importantes.

Os resultados mostram ainda que todos os instrumentos empregues neste estudo são eficazes na discriminação entre uma população sem diagnóstico e uma população clinicamente diagnosticada com PEA, sendo que a análise discriminante mostrou que a fonte mais importante de discriminação foi o AQ, seguido pelo FQ, que se mostrou muito mais útil na discriminação da população com PEA do que o EQ ou o SQ.

Conclusão: O presente estudo permite concluir que o FQ é um instrumento que capaz de fornecer dados confiáveis e válidos, úteis para a compreensão do significado das relações de amizade na população de pacientes com PEA. Assim, observa-se que o FQ é um instrumento relevantes para esse fim, preenchendo uma lacuna importante nos recursos disponíveis neste domínio. Assim sendo, a contribuição mais importante deste estudo

refere-se à utilidade do AQ e do FQ como ferramentas de diagnóstico na PEA, tendo o FQ um impacto positivo na discriminação entre a população com e sem PEA. No entanto, a utilização dos demais instrumentos (EQ e SQ) é também útil e importante para uma avaliação e caracterização mais profunda e detalhada desta perturbação.

Foi também possível observar que o grupo que pensa ter um diagnóstico apresenta resultados semelhantes, e nalguns casos ainda mais elevados do que os do grupo com um diagnóstico confirmado. Estes resultados podem ser relevantes na demonstração das dificuldades de pessoas com PEA não diagnosticadas e a viver na comunidade, deixando a perceção de que existem muitas pessoas nestas circunstâncias, que não estão a receber os apoios e serviços de que necessitariam. As dificuldades no diagnóstico estão entre os mais notórios obstáculos ao alargamento destes serviços, o que acentua a importância de instrumentos como os estudados neste projeto, que se mostram capazes de discriminar entre pessoas com e sem esta perturbação, abrindo potencialidades importantes não apenas a nível da avaliação clínica, como do rastreio (*screening*).

Palavras chave: Perturbação do Espetro do Autismo (PEA), Amizade, Avaliação Psicológica, Empatia, Sistematização.

1. Introduction

Over the last few decades, the recognition of Autism Spectrum Disorders (ASD) has increased significantly, reflecting an expanded interest of psychology in this population and the extensive research in this area. The Diagnostic and Statistical Manual of Mental Disorders (DSM-V) refers ASD as a disorder that causes persistent deficits in social interaction and communication across various contexts. Although this is well known, little has been studied about the meaning of friendship in adults with ASD. Considering this situation, the current study has two main purposes: (a) to contribute to the development of resources for the psychological evaluation of the relational domain in ASD, through the study of the Friendship Questionnaire (FQ; Baron-Cohen & Wheelwright, 2003) and its translation and adaptation into Portuguese and (b) to contribute to a better understanding of how the various aspects of ASD contribute to relational difficulties.

Regarding social communication, ASD is manifested by deficits in social-emotional reciprocity, ranging from abnormal social approach and failure of normal back-and-forth conversation to a reduced sharing of interests, emotions, or affect, to failure to initiate or respond to social interactions. In addition, there are deficits in nonverbal communicative behaviors used for social interaction, ranging from poorly integrated verbal and nonverbal communication to abnormalities in eye contact and body language or deficits in understanding and use of gestures to a total lack of facial expressions and nonverbal communication. Furthermore, deficits can be observed in developing, maintaining, and understanding relationships, ranging from difficulties adjusting behavior to suit various social contexts to difficulties in sharing imaginative play or in making friends, and to absence of interest in peers.

On non-social characteristics, ASD is distinguished by restricted, repetitive patterns of behavior, interests, or activities, manifested in stereotyped or repetitive motor movements, use of objects or speech, insistence on sameness, inflexible adherence to routines, ritualized patterns of verbal or nonverbal behavior, highly restricted, fixated interests that are abnormal in intensity or focus, hyper- or hypo-reactivity to sensory input or unusual interest in sensory aspects of the environment (American Psychiatric Association, 2013).

The Diagnostic and Statistical Manual of Mental Disorders (DSM-V) (American Psychiatric Association, 2013) considers three severity levels for ASD. Although all levels require support, Level 3 patients requires very substantial support,

Level 2 patients require substantial support and Level 1 patients require some support.

Deficits on verbal and nonverbal social communication skills are noticeable at Level 1, marked at Level 2 and severe at Level 3. Regarding responses to social overtures from others, these are usually unsuccessful at Level 1, reduced or abnormal at Level 2 and minimal at Level 3. As to social interactions, at Level 1 patients have a decreased interest, and at Level 2 and 3 these interactions are limited and very limited, respectively (American Psychiatric Association, 2013).

Whilst at Level 1 inflexible behaviors that affect the patient's independence are noticed, at Level 2 there are also restricted and repetitive behaviors and difficulties in managing situations of change (interfering with functioning in various contexts), which at Level 3 are very marked and interfere with operation in all spheres (American Psychiatric Association, 2013).

The present study focuses on patients with ASD Level 1 without intellectual or language impairment. Given that Level 2 and Level 3 patients display very limited social interactions, Level 1 patients are the ones that experience most interpersonal contact. To understand these deficits in social communication and social interaction, one must not forget the core of social interaction that underlies friendship relations.

Multiple articles focus on the importance of meaningful interpersonal relationships. Argyle (2001) approaches relationships as essential dimensions to happiness, agreeing with Lyubomirsky, King & Diener (2005), who suggest that individuals who experience more positive and less negative affect seem to be more prone to maintain successful and satisfactory relationships.

Most of the studies that address this topic focus on friendship relationships in children and adolescents with ASD. In the study conducted by Bauminger el al. (2008), friendships involving a child with ASD and a friend with typical development, and those of children with ASD and a friend with a disability were contrasted with friendships between typically developing children. Participants had stronger receptive language skills, were more responsive to one another, demonstrated more complex coordinated play and exhibited greater positive social orientation and cohesion when they were included in mixed friendships, in comparison to non-mixed dyads (Bauminger et al., 2008). However, Mazurek (2014) examined the relations among loneliness, friendship, and emotional functioning in adults with ASD, showing that a greater quantity and quality of friendships were associated with decreased loneliness even among these adults. The number of friends provided unique independent effects in predicting self-esteem in people

with ASD.

Although these relationships are of extreme relevance, the characteristics of ASD make their interactions harder and often impaired. Locke et al. (2010) showed that adolescents with ASD experienced significantly more loneliness than their classmates, had significantly poorer friendship quality, in terms of companionship and helpfulness, and had significantly lower social network status than their classmates. Also, 71.4% of the adolescents with ASD were either isolated or peripheral in their classroom. These findings imply that although inclusion in regular classrooms may allow adolescents with ASD to be involved in the social structure of their classroom, they experienced more loneliness, and poorer friendship quality and social network status as compared with their classmates.

Bauminger and Kasari (2000) also showed that, compared to typically developing children, children with ASD had less complete understandings of loneliness and were lonelier. Although all children with ASD reported having at least one friend, the quality of their friendships in terms of help, security and companionship was poorer. Fewer associations were found between friendship and loneliness for the autistic than for the non-autistic children, suggesting less understanding of the relation between these concepts.

Despite being an area where ASD patients have several problems, friendship remains an important predictor for the well-being of this population. By understanding what factors have an impact on ASD patients 'understanding of friendly relationships, we can contribute to the development of strategies and instruments that facilitate their interaction in this regard, improving patients' living conditions through friendship. Given the proven relevance of friendship relations, it becomes imperative to understand how adults with ASD view these interactions, and what they mean to them.

Two very important variables for understanding this issue are empathy and systematization. Eisenberg and Strayer (1990) define empathy as an emotional response that stems from another’s emotional state or condition and that is congruent with the other’s emotional state or situation. Meanwhile, systematization refers to the act of planning a system for something, or of organizing something in a system.

Associated with their difficulties in interpersonal relationships, people with ASD have marked deficits in understanding other persons’ emotional state, and many difficulties in reacting with empathy. On the other hand, their restricted and repetitive interests follow to a systematic view of the world, which leads their cognitive operation

to rely heavily on systematization. These variables might allow for a better understanding of many areas of functioning in ASD, in order to answer the question of "How do people with ASD understand friendship relationships?".

Baron-Cohen (2002) tried to answer this question with the Extreme Male Brain Theory. In this theory, he suggests that women show a tendency to be more empathic in relationships (with a rather inferior proneness to systematization) and men show a higher tendency to systematize (with a rather inferior proneness to empathy). Patients with ASD show a level of systematization superior, and a level of empathy inferior, to adult males with no diagnosis (Baron-Cohen, 2002), thus justifying the name of the theory and supporting the relevance of an approach that takes empathy and systematization into consideration in understand the meaning of friendship relations in ASD.

Although the FQ has the potential to be a useful instrument in the characterization and evaluation of ASD in Portugal, there is as yet no Portuguese translation and its potential has been little studied in the adult population with ASD, even at the international level. Therefore, this study has two main purposes: (a) to contribute to the development of resources for the psychological evaluation of the relational domain in ASD, through the study of the Friendship Questionnaire (FQ; Baron-Cohen & Wheelwright, 2003) and its translation and adaptation into Portuguese and (b) to contribute to a better understanding of how the various aspects of ASD contribute to difficulties in the social and relational domain.

The study of this questionnaire in conjunction with the AQ, EQ and SQ is also innovative. Given the nature of these questionnaires, it is hypothesized that higher scores in the AQ (level of autism traits) will be related to lower scores in the FQ (a superficial view of friendship relations). It is hypothesized that lower scores in the FQ will correlate with higher scores in the SQ (interest in systematization) and lower scores in EQ (low empathic competence). The most important contribution of this study will stem from the study and analysis of the FQ as an innovative resource in the evaluation and characterization of ASD, which had not yet been studied in the Portuguese population, and for which there is little international research in terms of its use with adults with ASD.

2. Method

2.1. Participants

The sample for the present study was composed of two sub-samples. The first included 33 participants that had been diagnosed with ASD. These participants were recruited from institutions in the Greater Lisbon area serving persons with developmental disorders and were diagnosed according to the institutions' criteria.

The second sub-sample included 498 participants that where recruited online, mainly from websites that discuss ASD. Of these participants, 13 claimed to have an ASD diagnosis. However, given the circumstances of the administration, it is impossible to assure the quality of the diagnosis. Another 28 participants said that they did not have a formal diagnosis but believed they had ASD features that might justify such a diagnosis. The remaining 457 participants reported no diagnosis or suspicion of ASD.

The total sample, therefore numbered 531 participants**.** Their mean age was 35.92 years, with a standard deviation of 12.81, ranging between 18 and 74 years. As to gender, 74.8% were female and 25.2% male. Whilst the group of participants with a diagnosis guaranteed by the institution was mostly constituted by men (84.8%), in the groups that reported they had a diagnosis or thought they might have one, most were women (61.5% say they had a diagnosis and 64.3% thought they might have one). The same happened in the group without diagnosis or suspicion (80.1% of women). It is relevant to note that the percentage of men who claimed they had an actual or possible diagnosis or ASD was greater than in the group without suspicion. This is congruent with fact that the probability of ASD is higher in men.

Regarding education, 52.4% of the sample had a college degree and 37.5% had finished secondary school, with 56.1% employed full time. As to marital status, 70.9% of the participants with no diagnosis were in some type of relationship (married, dating, engaged or living together) while only 6.1% of the diagnosed population was in some type of relationship. Of participants who claimed a diagnosis in their online participation, 46.2% are married, a figure comparable to the 42.9% found among participants who thought they might have a diagnosis. Residents in the district of Lisbon comprised 72.3% of the sample.

2.2. Instruments

2.2.1. FQ

The Friendship Quotient (FQ) is a self-administered questionnaire designed to assess whether participants enjoy trusting, affable and mutually supportive friendships, like people and are interested in interaction with others for its own sake (Baron-Cohen & Wheelwright, 2003). The FQ includes 35 questions, 27 of which are scored. The maximum score for each item is 5 points, with fewer points given for some of the items. A sample item includes the alternatives “I tend to think of an activity I want to do and then find somebody to do it with” versus “I tend to arrange to meet somebody and then think of something to do”. About half of the items are reverse scored. Items on different topics are randomly scattered across the questionnaire and do not require interpretation from the scorer. Its initial validation was carried out with a sample of 68 adults (51 men and 17 women) with ASD, which obtained significantly lower results than the adults in the control group (Baron-Cohen & Wheelwright, 2003). Cronbach’s alpha was.75, indicating high internal consistency. This study did not include a factor analysis. The FQ was translated for the current study by the author of this dissertation, and blindly back translated by her advisor.

2.2.2. AQ

The Autism Spectrum Quotient (AQ) measures the presence of autism traits. It consists of a self-report questionnaire with 10 statements concerning 5 distinct areas in which pathologies within the autistic spectrum are manifest (social skills, attention modulation, attention to detail, communication and imagination). The present study used the short version of the test, to keep administration time within reasonable limits. Participants were asked to respond on a scale of *definitely agree* to *definitely disagree*, to items such as “I find it difficult to work out people’s intentions”. In previous studies, 1 point was attributed to the option most directed to the typical autistic behavior, and 0 points to all others, for a maximum result of 10 points (Baron-Cohen, Wheelwright, Skinner, et al., 2001). In the present study the scoring was done in a 4-point scale, as preliminary tests showed that it increased the correlations and Cronbach's alpha.

In the validation study of the original version of AQ (Baron-Cohen, Wheelwright, Skinner, Martin & Chubley, 2001), the authors administered the questionnaire to

populations with and without ASD, obtaining an average score of 16.4 (SD = 6.3) for the control group and 35.8 (SD = 6.5) for the group with ASD. The AQ thus appears to have sufficient discriminatory power to separate individuals with adequate social communication skills from those with greater disability in this domain, such as ASD patients (Baron-Cohen, Wheelwright, Skinner, et al., 2001). The internal consistency of items in each of the five questionnaire domains was also calculated, and Cronbach's alpha coefficients were all moderate to high (Communication = .65; Social, = .77; Imagination = .65; Local Details = .63; Attention Switching = .67). The original five domains were found in all subsequent studies, including the adaptation to the short version of the test (Allison et al., 2012; Baron-Cohen et al., 2001; Hoekstra et al., 2008; Wakabayashi et al., 2006; Wheelwright et al., 2006; Woodbury-Smith et al., 2005).

The Portuguese version we employed was adapted by São Luís Castro and César F. Lima, from the University of Porto, in February 2009, and is available online at the Autism Research Centre's Website (http://www.autismresearchcentre.com). Although the scale has already been used in some studies (Alves, 2019; Lima & Castro, 2011; Pestana, 2013), it has never been subjected to an adequate psychometric analysis.

In the present study, an exploratory analysis, by means of the principal components technique, with varimax rotation, was carried out to analyze the number of components in the short version of the AQ scale. A scree plot indicated the presence of only one factor. Given that the previous studies showed 5 distinct areas, the finding of only one factor might be due to the use of a short form, with only 10 items, or to the low percentage of people with ASD sample in our sample. The obtained value of Cronbach's alpha coefficient was .50.

2.2.3. EQ

The Empathy Quotient (EQ) is a self-report instrument that has been explicitly designed for application in the clinical context, and therefore to be sensitive to lack of empathy as a psychopathology trait (Lawrence et al., 2004). It involves 60 questions, divided into two types: 40 questions regarding empathy and 20 distractors. Each item has a rating of 0, corresponding to a report of no empathic behavior at all, 1 for some empathy behavior and 2 points for strong empathy. In the present study, the scoring was done on a 4-point scale, which increased values of alphas and correlations somewhat. A short

version of 22 items was used, of which 16 were reverse scored, and no distractors were included. A sample item is “I really enjoy caring for other people” (Baron-Cohen and Wheelwright, 2004).

This test was adapted by São Luís Castro and César F. Lima, from the Speech Laboratory of the Faculty of Psychology and Education Sciences of the University of Porto, in November 2013. It was also adapted by Miguel Duarte at the European University in Lisbon in November 2016 and by Jean-Christophe Giger at the University of Algarve in Faro in June 2011 (Rodrigues et al., 2011). All these adaptations are available online at the Autism Research Centre’s Website. The last two adaptations were used in the present study: the initial instructions were taken from the second and the items from the third. The third adaptation was chosen, with permission from its authors, as it has a more appropriate language for the population to which it was administered. It was necessary to use the initial instructions present in the second adaptation, as these were not present in the third version.

The EQ had been validated in 197 healthy control volunteers and 90 people with ASD, demonstrating a reliable distinction between the clinical and the control group (Lawrence et al., 2004). The 90 adults (65 men and 25 women) with ASD, had significantly lower results than the 90 adults (65 homes and 25 women) in the control group. Participants with ASD scored 30 points or less out of 80 in 81% of the cases, compared with only 12% of control group participants (Baron-Cohen and Wheelwright, 2004), ensuring the usefulness of this questionnaire in characterizing ASD. Cronbach’s alpha was for the full-scale EQ was .92, quite a high value. Lawrence et al. (2004), found 4 main factors in the EQ, referring to cognitive empathy, emotional reactivity and social skills. Similar results were found by Muncer and Ling (2006). In Portugal, the validation of the Empathy Quotient involved a sample of 506 participants, and the four main factors found were Cognitive Empathy, Emotional Reactivity, Social Skills and Empathic Difficulties (Rodrigues et al., 2011). Full-scale Cronbach’s alpha was .85.

In the present study, an exploratory analysis, by means of the principal components technique, with varimax rotation, was carried out to analyze the number of components in the short version of the EQ scale. A scree plot indicated the presence of tree factors, regarding Social Perceptiveness (EQ-SP), Care/ Altruism (EQ-C/A) and Self-Centeredness/Insensitivity (EQ-SC/I). The full-scale of the short version of the EQ employed in this study yielded a .84 alpha. The scales derived from the components

analysis showed a very reasonable internal consistency, considering the number of items in each subscale (.83 for social perceptiveness; .67 for care/altruism; .71 for self-centeredness/ insensitivity).

2.2.4. SQ

The Systematization Quotient (SQ) was developed to fill the need for an instrument assessing interest in systems of different types (Baron-Cohen et al., 2003). It is a self-report measure, involving 60 questions, 40 of which regard systematization and 20 are distractors. The present study used a short version of 25 items. Half of the items are reverse scored. Respondents are awarded 2 points if they demonstrate a strong systematization response, 1 point if they show this type of response only slightly, and 0 points if they do not demonstrate this type of response. In the present study, the scoring was done on a 4-point scale, which increased values of alphas and correlations somewhat.

The validation of this questionnaire was carried out by Baron-Cohen et al. (2003) in whose study the SQ was administered to 47 adults (33 men and 14 women) with ASD, producing a significantly higher mean score on the SQ, when compared with that of 47 adults of the general population. Cronbach's alpha coefficient on the SQ (for all participants) was .79 (Baron-Cohen et al., 2003). No factors were found in any of the previous studies (Baron-Cohen et al., 2003; Goldenfeld et al., 2005; Wheelwirght el al., 2006).

This questionnaire was translated and adapted to Portuguese by Charlotte Coelho from Fernando Pessoa University of Porto in 2015. It was also translated by Miguel Duarte at the European University in Lisbon in November 2016. These adaptations are available online at the Autism Research Centre's Website. The present study employed the version by Charlotte Coelho. The validation of the Portuguese version of the SQ involved a sample of 506 participants, and the two main factors found were Contents and Processes (Rodrigues et al., 2010). The full-scale Cronbach's alpha was .72.

In the present study, an exploratory analysis, by means of the principal components technique, with varimax rotation, was carried out to analyze the number of components in the short version of the SQ scale. A scree plot indicated the presence of tree factors, interpreted as referring to Curiosity for Origin/Creation (SQ-CO/C), Curiosity for Functioning (SQ-CF) and Cognitive Difficulties/Lack of Interest (SQ-CD/LI). The full-scale Cronbach's alpha was .86 alpha. The scales derived from the exploratory factor analysis had a very reasonable internal consistency, considering the

number of items for each subscale (.75 for curiosity for origin/ creation; .73 for curiosity for functioning; .73 for cognitive difficulties/ lack of interest).

2.3. Procedures

All procedures were in accordance with the ethical standards of the Ordem dos Psicólogos Portugueses (the legally accredited association of Portuguese professional psychologists) and were approved by the Deontological Committee of the Faculty of Psychology of the University of Lisbon. Informed consent was obtained from all individual participants included in the study.

The first sub-sample of participants, that had been diagnosed with ASD and were recruited from institutions that specialize in neurodevelopmental and other disorders, signed the informed consent on paper. The second sub-sample was recruited online, mainly through websites that discuss ASD. These participants read the informed consent before accessing the questionnaire and agreed to respond anonymously and voluntarily. In either case, participants remain anonymous and could quit at any time.

Statistical analysis was carried out with the IBM SPSS software platform, version 26.

3. Results

3.1. Psychometric Analysis of the FQ

Previous studies have not examined the presence of different factors in the FQ. This instrument being the focal point of the present study, an exploratory analysis, by means of the principal components technique with Varimax rotation, was carried out on the translated version of the FQ scale. A scree plot indicated two possible options regarding the number of factors, one with two and another with five (see Table 1). A parallel analysis carried out with the procedure described in O'Connor (2000) also indicated five factors. In the two-factor solution, the first related to Motivation for Contact (FQ-MC), given that the items with the highest loadings refer to interest in what goes on in other people's lives and the amount of social contact desired. Items with results greater than .45, or with markedly superior results (shown in the table in bold), were selected for the scale measuring this component, producing a Cronbach's alpha of .66. The second relating to Yielding (FQ-Y), as the highest loading items related to the willingness and

ability to bend one's preferred way of dealing with situations or even abdicating from face saving when it is helpful or necessary to preserve a relationship (items shown in the table in bold type, with a Cronbach's alpha of .63).

Table 1

Factor Loadings Matrix: Two and Five Factors

	Solution 1		Solution 2				
	1	2	1	2	3	4	5
1. Best friends	-.01	.11	.01	-.03	.05	-.03	.40
2. Most important thing in a friendship	.00	.23	.01	.14	.09	-.04	**.58**
3. Posture towards friendship	.03	.17	.03	.37	-.05	.12	.16
4. Proximity preferences	**.49**	.25	**.53**	.17	.12	.09	-.21
5. Quality of phone conversations	.09	.39	.20	**.50**	.00	-.19	-.17
6. Objectal view of friendship meetings	.03	.33	.02	**.64**	.08	-.10	.08
7. Quality of meetings	.01	.36	.05	**.67**	-.02	-.05	.08
9. Personal role in friendship	.14	.28	.17	.30	-.01	.17	**.50**
10. Role in helping friends	.19	-.23	.01	.05	-.08	**.57**	.11
12. Ability to ask for help	**.45**	.27	**.50**	.10	.11	.13	.10
13. Approach when criticizing a friend	.09	-.27	-.06	-.02	-.11	**.46**	-.05
14. Conflict resolution	.13	**.48**	.42	.01	-.04	-.27	.24
15. Ideal workspace	.33	.30	.31	.30	.31	-.20	-.12
16. Ease in sharing feelings	**.49**	.39	**.71**	-.01	-.04	.11	.06
18. Similarity to friends	.39	.16	.42	-.09	.15	.07	.10
20. Importance of what friends think	**.49**	-.28	.18	-.11	.23	**.58**	.11
22. Ease in admitting being wrong	.09	**.62**	**.49**	-.01	-.11	-.35	.35
23. Vulnerability	.36	**.60**	**.74**	-.02	-.12	-.09	.28
25. Interest in the everyday details of close friends' lives	**.61**	.08	.42	.21	.30	.35	.06
26. Interest in the everyday details of casual friends' lives	**.53**	-.05	.29	.14	.35	.26	-.17
27. Importance of "gossip"	.31	-.35	.05	-.07	.15	**.42**	-.27
28. Importance of friendship versus career	.32	.23	.39	.13	.11	-.07	-.22
29. Frequency of meetings with friends	**.52**	.04	.43	-.04	.29	.11	-.22
31. Ease in making friends	.30	.32	**.48**	.06	.06	-.22	-.33
32. Minimum social contact needed per day	**.45**	-.14	.02	-.02	**.81**	-.12	.06
33. Minimum social contact needed per week	**.56**	-.21	.09	-.09	**.79**	.09	.15
34. Conversation theme with friends	-.07	-.05	-.15	.24	-.04	.13	.00

In the second option, 5 components were extracted, the first referring to Flexibility (FQ-F), given that the items of this factor refer to the ability to accept the perspectives of others and to expose themselves in the relationship, with a Cronbach's alpha of .65. The second factor refers to the Valuation of the Other (FQ-VO), and the items refer to the

valuation of the person with whom the friendship relationship is shared, instead of the objective view of it to carry out activities and achieve objectives, with a Cronbach's alpha of .48. The third factor refers to Physical Proximity (FQ-PP), and the items refer to the amount of contact that the individual needs, with a Cronbach's alpha of .68. The fourth factor is related to Empathy (FQ-E), and the items refer to the focus on what others think, curiosity in relation to others and what a 3rd person thinks about the other, with a .34 Cronbach's alpha. The last factor refers to the Friend Role (FQ-FR), and its items refer to the role of friend as a person who supports versus a more superficial role related to having fun together, with a Cronbach's alpha of .29.

The scales measuring the two factors in the FQ (MC and Y) were found to be positively correlated, giving some support to the use of a global score, for which we obtained a .66 Cronbach alpha.

3.2. Correlations among scales

Correlations among scores in the different instruments and scales are presented in Table 2. Complex correlation patterns are observed, which would be too extensive to comment on in detail and, in any case, would need to be replicated in other studies, as many differences may be due to chance. Widely ranging values are observed for the correlations, between almost 0 and about .7. These differences seem to indicate a good degree of discriminating validity between the factors, suggesting that they should be retained and considered, in future studies and practical use.

Although space limitations and parsimony recommend caution in interpreting fine detail in the correlation matrices, we would like to call attention to some relevant, broad aspects. There are noticeable differences between correlations obtained for the entire sample and among the clinical population only, which raise several possibilities of interpretation. In broad terms, however, we should begin by noticing the moderate correlation between the FQ and the AQ, confirming that the FQ is significantly related to autism traits. The FQ is, however, even more strongly related to the EQ, something expectable considering the proximity between the concepts of empathy and friendship. The SQ seems to provide the weakest correlations with the other scales, when seen globally. One should also notice, however, the strong correlations between the EQ and the AQ, mainly in the EQ-SP factor, regarding Social Perceptiveness (EQ-SP). The strong correlation between AQ and EQ is also seen in the clinical population.

Table 2

Correlation Matrix: Two Factors

	FQ	FQ MC	FQ Y	AQ	EQ	EQ SP	EQ C/A	EQ SC/I	SQ	SQ CO/C	SQ CF	SQ CD/LI	FQ F	FQ VO	FQ PP	FQ E	FQ FR
FQ	-	.84**	.53**	-.14	.40*	.25	.69**	.02	-.17	.02	-.33	-.01	.89**	.18	.56**	.60**	.33
FQ-MC	.78**	-	.20	-.02	.39*	.29	.68**	-.13	.01	.12	-.23	.15	.74**	.06	.72**	.75**	.14
FQ-Y	.51**	.31**	-	-.02	.14	.10	.31	.08	-.34	-.20	-.33	.02	.64**	-.19	.13	.23	.22
AQ	-.34**	-.20**	-.18**	-	-.55**	-.43*	-.15	-.48**	.29	.19	.19	.16	-.07	-.05	-.06	-.24	-.01
EQ	.52**	.41**	.29**	-.63**	-	.85**	.56**	.50**	-.10	.00	.00	-.01	.46**	.11	.33	.39*	-.05
EQ-SP	.35**	.27**	.20**	-.56**	.85**	-	.31	.11	-.06	.07	-.14	.18	.37*	.06	.23	.40*	-.19
EQ-C/A	.48**	.38**	.30**	-.33**	.70**	.49**	-	.04	-.11	.12	-.17	-.02	.69**	.29	.42*	.47**	.01
EQ-SC/I	.41**	.32**	.21**	-.46**	.68**	.29**	.29**	-	-.14	-.27	.30	-.34	-.02	-.13	.05	-.12	.23
SQ	-.01	.06	.12**	.19**	.01	.03	.01	-.03	-	.66**	.54**	.61**	-.12	-.27	-.19	-.01	.07
SQ-CO/C	-.08	.00	.03	.27**	-.08	.03	.03	-.26**	.64**	-	-.07	.45**	.03	-.07	-.22	.18	-.06
SQ-CF	.06	.05	.12**	-.04	.13**	.01	.03	.28**	.67**	.08	-	-.03	-.25	-.20	-.16	-.37*	.07
SQ-CD/LI	-.06	.03	.09*	.19**	-.04	.04	-.04	-.14**	.75**	.42**	.27**	-	.13	-.24	-.02	.29	-.03
FQ-F	.74**	.74**	.66**	-.28**	.45**	.33**	.41**	.30**	.10*	.00	.10*	.06	-	.05	.46**	.54**	.22
FQ-VO	.50**	.14**	.17**	-.19**	.19**	.15**	.23**	.10*	-.06	-.05	-.03	-.09*	.20**	-	.00	-.08	-.21
FQ-PP	.34**	.54**	.03	-.04	.15**	.15**	.10*	.08	.01	-.01	-.02	.03	.15**	.03	-	.49**	.25
FQ-E	.15**	.36**	-.02	-.05	.04	.02	.04	.05	-.04	-.06	-.04	.01	.09*	-.06	.20**	-	.00
FQ-FR	.37**	.14**	.18**	-.22**	.26**	.13**	.29**	.21**	-.02	-.07	.06	-.08	.19**	.15**	.05	-.04	-

Note. ** - $p < .01$. * - $p < .05$. Correlations above the diagonal are those obtained only in the clinical population and those below in the complete sample.

In addition to the general patterns, some other, more specific, correlations call attention for their values. For example, regarding relationships between friendship and intimacy, a particularly dramatic correlation is found in the clinical sample between Motivation for Contact (FQ-MC) and Care/Altruism (EQ-C/A), much stronger than those for other scales of the same instruments. When the five factors solution is considered, a similar correlation is found for the Flexibility (FQ-F) factor, suggesting that care/altruism is powerful driver of flexibility when approaching others, more than when having to admit one is wrong, among people with ASD. Within the panorama of weak correlations with the SQ scores, the stronger effects relating them to the empathy facet of Self-Centeredness/Insensitivity (EQ-SC/I) raise important theoretical and practical implications. Again only in the ASD sample, it should be noticed that the Empathy factor of the FQ (referring to focus on what others think and curiosity in relation to others' lives) is related to scores in the EQ, especially for Social Perceptiveness (EQ-SP) and Care/Altruism (EQ-C/A), and to Curiosity for Functioning in the SQ (SQ-CF), the latter in a negative direction. Such correlations are absent in the global sample, in which a majority of non-ASD people are found.

3.3. Group comparisons

We have employed a multivariate analysis of variance (MANOVA) to test the hypothesis that the four subsamples are significantly different in the variables considered. The multivariate test was significant, Pillai's trace = 0.22, $F(12, 1578) = 10.54$, $p < .001$. Significant differences were also observed for all instruments, except for the SQ, where the result was marginal (see Table 3).

Table 3

Group Comparisons

	Institution Diagnosis		Online: "Yes, I have ASD"		Online: "I think I may have ASD"		Online: "I do not have ASD"			
	M	SD	M	SD	M	SD	M	SD	F	Sig.
AQ	24.48_a	4.29	23.31_a	5.19	22.93_a	4.24	18.56_b	3.44	44.41	<.001
EQ	60.82_a	9.53	63.00_a	12.92	62.25_a	11.61	70.87_b	8.60	22.28	<.001
SQ	65.06_a	9.98	67.31_a	11.14	68.11a	15.78	62.75_b	11.93	2.53	.056
FQ	67.85_a	17.21	77.15_a	19.54	69.82_a	19.37	80.73_b	14.60	11.34	<.001

Note. Means with different subscripts are significantly different in a Tukey HSD test. All F tests have a total of 530 degrees of freedom (3 between groups and 527 within groups).

Tukey HSD multiple comparisons questionnaires show that the population reporting no signs of ASD is significantly different from all others: those with a diagnosis established by an institution, those who responded online but indicated that they have a diagnosis and those who merely believe they may be worthy of a diagnosis. The fact that the latter three groups do not significantly differ among themselves suggests that these claims and perceptions may have some basis in reality and, the results even suggest the suspicious group may be worse off than the clinical population in terms of systematization and friendship difficulties.

In any case, the results support the expectation that the instruments employed in this study can all discriminate between a normal and a clinically diagnosed, ASD population. The dubious status of the other two groups led us to exclude them from analyses exploring the diagnostic discrimination efficiency of our instruments, presented in the next section.

3.4. Discriminant Analysis

Discriminant analysis is used to analyze data when the dependent variable is categorical, and the independent variables are continuous. In the present study, a discriminant analysis was carried out in order to test whether the instruments employed discriminate between the populations with and without diagnosis, and which of the scales are in the most useful for that purpose. We employed indicators such as Wilk's Lambda, Canonical Correlation and Cohen's Kappa to assess the accuracy of the discrimination. Wilk's Lambda is an index of unexplained variance, and therefore lower figures indicate better prediction. The canonical correlation indicates the degree of relationship between the discriminant function obtained in the analysis and the actual classification of cases, in the familiar metric of correlation. Cohen's kappa indicates the degree of improvement upon a chance assignment of cases, (which would yield a value of 0) relative to a perfect prediction (which would yield a value of 1). Due to the issues mentioned in the previous section, we have excluded groups with an uncertain status (claiming or suspecting a diagnosis), and tested discrimination only between the clinical sample and the group with no signs of ASD.

Table 4

Discriminant Analysis Results

	Global Scores	2 FQ factor model	5 FQ factor model
Canonical Correlation	.40	.48	.53
Wilk's Lambda	.84	.77	.73
Sig.	<.001	<.001	<.001
Cohen's K	.31	.38	.41

Initially, the analysis was carried out using the global score of each instrument, and it immediately demonstrated an ability to discriminate significantly between both populations (see Table 4). In addition to the statistical significance of the Wilk's lambda and canonical correlation coefficients, Cohen's kappa indicated a relevant degree of improvement in the classification, relative to chance. The role of each measure was examined by looking at standardized canonical discriminant function coefficients. These showed that the most important source of discrimination was the AQ, with a coefficient of .86, followed by the FQ, with a value of -.25. The FQ was thus much more useful in the discrimination of the ASD population than the EQ (-.08) or the SQ (-.01).

In spite of the significant prediction obtained with global scores, we proceeded by examining whether considering individual factors would further improve prediction, beginning with the two-factor solution for the FQ and the scales previously mentioned for the EQ and SQ. It can be seen from Table 4 that the classification improved noticeably. We followed up by employing the five-factor option for the FQ and obtained a further improvement in prediction. These results, therefore, clearly support the use of factor scores, instead of global scores, in support of the diagnosis of ASD disorders. Standardized canonical discriminant function coefficients in the final analysis indicated that the most effective predictors were the AQ, with a coefficient of .70, followed by the EQ-C/A, with a -.41 coefficient. SQ-CF had a result of -.34 and FQ-MC had a .34 result.

4. Discussion

The present study aimed to study and obtain validation data for the Portuguese version of the FQ. It also had the objective to study the AQ, EQ and SQ instruments in greater depth, from the psychometric point of view, than had been done so far in the literature, and to understand the contribution each of them can give to the assessment and diagnosis of ASD.

Regarding the first objective, we believe we have obtained strong indications that the Portuguese version of the FQ can provide reliable and valid data for the assessment of friendship attitudes and capacities among persons with ASDs. We consider the FQ to be a very important instrument for this purpose, filling an important gap in the resources available in that regard. The results we have obtained support these ideas, and show that high scores in the FQ, globally and, most usefully, in separate factor scales, are obtained by respondents who are motivated to contact with other people and are able to yield in conflict situations, and on the other hand, show flexibility to accept the perspectives of others, value the person with whom the friendship is shared, keep physical proximity with their friends, show curiosity in relation to others and what a 3rd person thinks about the other and have a role in the friendship as a person who supports the other. Previous studies showed that these participants report enjoying interaction with others for its own sake, enjoy empathic supportive friendships, like and are interested in people and consider friendships important (Baron-Cohen & Wheelwright. 2003). The results of this study show that the patients with ASD scored significantly lower on the FQ than adults with no diagnosis drawn from a general population and therefore the FQ has good predictive validity. The interpretability of factors and correlations with other scales (e.g., correlation with the AQ, but higher with the EQ), and the moderate to high alpha coefficients, also support construct validity.

Regarding the second aim of this study, we have employed the short form of the AQ, to avoid making the protocol too long, and this option rendered further examination of its factor structure difficult, due to the small number of items. In addition, its nature as a set of disparate symptoms and indicators explains the modest internal consistent reliability coefficient. Even so, its ability to discriminate among persons with and without ASD as its correlations with other scales, which made theoretical sense, support its validity as a measure of autistic spectrum traits in the Portuguese population. Although the AQ is not a diagnostic instrument, it may serve as a useful resource in screening and in assessing the extent of autistic traits shown by an adult (Baron-Cohen, Wheelwright, Skinner et al., 2001).

Regarding the EQ, it also showed good construct validity, shown by the interpretability of factors, the good levels of internal consistency reliability, and the theoretically consistent correlations with other measures. Although it did not prove to have major usefulness in differentiating populations with ASD (results appeared to

suggest that the information it could provide was subsumed by the AQ), it showed significantly different scores in the two populations, confirming its potential usefulness in assessing the deficits in empathic attitudes and capacities (e.g., social perceptiveness, care/ altruism, self-centeredness/ insensitivity) pointed out in Baron Cohen's (2001) proposal that there is a deficit in the "theory of mind" underlying ASD.

As to the SQ, this instrument also showed good construct validity, measuring several aspects of systematization, as found by the exploratory factor analysis (curiosity for origin/ creation, curiosity for functioning, cognitive difficulties/ lack of interest) show moderate to high alpha coefficients. Although the SQ did not provide many significant relationships with other variables, it too significantly differentiated the two main populations under study, even if its usefulness in discriminative diagnosis was superseded by the presence of other instruments. The obtained correlations also illuminate some important consequences of this attitude, and point towards possible practical implications (e.g., systematization seems to underlie difficulties in yielding to others that cause difficulties in relationships, but do not directly affect aspects of empathy to the same extent). This suggests that even if the SQ did not correlate strongly with other measures and appeared not to help much with diagnostic discrimination, it did show higher mean scores in the population with ASDs and can play an important role explaining certain problematic patterns of behavior, making systematization an important target for intervention and the SQ a relevant assessment instrument.

Regarding the third objective of this study, to understand the contribution each of the questionnaires can give to the assessment and diagnosis of ASD, Discriminant Analysis has shown that the most useful for this purpose is the AQ. It also showed, however, that the FQ is an important adjunct, which improves the effectiveness of the discrimination when employed together with the AQ. As to the EQ and SQ, these do not seem to contribute significantly to the classification of persons as with or without ASD. This may be related to the fact that several signs and symptoms related to empathy and systematization are also present in AQ. For example, the AQ item "I know how to tell if someone listening to me is getting bored", addresses empathy and in the item "I like to collect information about categories of things (e.g., types of car, types of bird, types of train, types of plant etc.) ", focuses on systematization. This overlap makes the EQ and the SQ less crucial in differentiating between people with and without ASD.

But even though the EQ and the SQ may not be essential for diagnosis, they are still useful in clinical assessment, as they are relevant indicators of specific areas of

functioning. Take, for example, the correlation found in the clinical population between the SQ and the FQ-Y factor, relative to the ability to yield in the friendship relationship. This result indicates that systematization seems to lead to difficulty in yielding, producing a behavior pattern of not admitting to be wrong. This indication may be important in clinical intervention, in the sense that if a patient with ASD has difficulties in situations in which yielding would be advisable, while also showing a high level of systematization, the intervention might be more successful if it also addressed the excessive tendency towards systematization. In such a case, the SQ would obviously be a relevant assessment instrument for the guidance of intervention.

As for the EQ, there are correlations between the FQ-E factor, related to curiosity about the lives of other people and the way one is seen by others, and the EQ-SP factor, related to social perception. This correlation may be pointing out an important mechanism in the understanding of social difficulties in ASD. Patients with this kind of disorder may be less interested in social contact due to their difficulties in understanding people, a capacity assessed by the EQ-SP factor. Their low competence in social perception may lead to a tendency to give up the interaction, making an intervention focusing on this type of competence may be beneficial and led to important sociability gains in this population, beyond those achieved by focusing on motivational issues. Another rather interesting result indicates that interest on how objects work, measured by the SQ-CF scale, correlates negatively with friendship attitudes, as measured by the FQ. This intriguing relationship, showing that empathy and systematization are not mere additive contributors to ASQ, but are directly related to one another, could be an important and interesting object of study for future investigations. The finding in the current study that the EQ and the SQ may not be essential in identifying ASD cases, therefore, does not preclude these instruments from proving extremely useful tools both in clinical assessment and in further research.

Other interesting findings concern the groups that indicated having an ASD or believing they may have one. Results show these groups to be similar to the group with a confirmed diagnosis and, in the SQ, their average scores are even higher. These data point towards the existence of a considerable number of persons with ASD disorders living in the community who have not being diagnosed and, consequently, are not seeking help and not receiving adequate support. It seems likely that some characteristics of ASDs themselves, such as a dislike for social contact, may be a factor in such reluctance. These difficulties make even more necessary the provision of instruments such as those studied

in this project, which discriminate between persons with and without ASD and can be extremely useful as screening tools in the community, even if made available online, making it easier for suspect cases to access available services.

4.2. Strengths and Limitations

The present study includes several innovative aspects that strengthen its contribution. Firstly, it was possible to collect a large sample of the population without a diagnosis, as well as some participants that report having or considering that they may be worthy of a diagnosis of ASD. The combination of these populations with the clinical population provided for a diversified total sample. Combined with the inclusion of four different instruments, it allowed for a rich and fruitful psychometric analysis.

Despite these aspects, limitations can be pointed out in the present study, such as the major numerical imbalance between the clinical population with ASD and controls, mainly due to the scarcity of institutions and services in Portugal engaging with an adult population with high-functioning ASD. This discrepancy was mitigated by the presence of participants who reported a diagnosis or their suspicion, but this is not an entirely adequate solution.

Another limitation was the exclusive use of self-report instruments, that are dependent on the participants' insight and their perception of their skills and difficulties. In ASD, the level of insight about these areas is often limited, which may pose limits to the validity of this type of measure. Self-ratings of empathy, for example, may depend on the person's mood, as well as on his/her skills for social interaction. In addition, these instruments may not be appropriate for patients with cognitive impairments, as they require comprehension and reading skills, limiting the population to which our conclusions can be applied.

Finally, on further limitation was that, while the clinical subsample responded to the questionnaires on paper and with the presence and help of a researcher, the other subsamples responded anonymously online, creating a confound whose effects are difficult to assess. The lack of significant differences between the clinical subsample and those with self-reported or suspected diagnoses, however, seems to indicate that this was not a serious problem.

4.3.Implications

Diagnosing ASD has always been a challenge from a clinical point of view. Many

instruments assess the symptoms in these disorders. but not that many try to understand the deeper meaning of social relationships in ASD. With the Friendship Questionnaire it becomes possible to expand knowledge in these areas, expanding the range of accurate, reliable and valid instruments available for use in ASD assessment, and enriching knowledge for new therapeutic interventions.

This study widens our knowledge about ASD traits, and can help us understand how, and through what mechanisms, these traits influence friendship relations. As a further way to expand our horizons in the understanding of ASD trough friendship relations, it would be interesting to assess the other side of the relationship, gathering data from friends of people with ASD. This could be a next step in early diagnosis, with the development of a questionnaire to assess the meaning of relationships with persons affected by ASDs.

The most important contribution of this study refers to the usefulness of the AQ and FQ as diagnostic tools in ASD, with the FQ having a positive impact on discrimination between populations with and without ASD, beyond that of the AQ. The usefulness of the EQ and SQ, however, and of employing factor subscales in the different instruments, were also sustained, for a deeper and more detailed assessment and characterization of these disturbances.

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