



ELSEVIER

Available online at www.sciencedirect.com



Personality and Individual Differences 43 (2007) 541–551

PERSONALITY AND
INDIVIDUAL DIFFERENCES

www.elsevier.com/locate/paid

Adult theory of mind, cooperation, Machiavellianism: The effect of mindreading on social relations

Tunde Paal, Tamas Bereczkei *

University of Pécs, Institute of Psychology, Pécs, Ifjúság u. 6, H-7624, Hungary

Received 19 September 2006; received in revised form 8 December 2006; accepted 22 December 2006

Available online 16 February 2007

Abstract

Theory of mind – the ability to attribute independent mental states and processes to others – plays an important role in our social lives. For one, it facilitates social cooperation, for two, it enables us to manipulate others in order to reach our own goals. In our study, we intend to analyze some basic aspects of the complex relationship between adult theory of mind and social behavior that had not been researched in depth so far. Our results show (1) a strong negative correlation between Machiavellianism and social cooperative skills; (2) a connection between the extent of cooperative tendency and the level of mindreading; and (3) a lack of significant correlation between theory of mind and Machiavellianism. For the interpretation of the results – especially for our third finding – we used the concepts of “hot” and “cold” empathy, the lack of representation of moral emotions, as well as other cognitive explanatory models.

© 2007 Published by Elsevier Ltd.

Keywords: Adult theory of mind; Machiavellianism; Cooperation; “Hot” and “cold” empathy

* Corresponding author. Tel./fax: +36 72 501516.

E-mail address: btamas@btk.pte.hu (T. Bereczkei).

1. Introduction

1.1. *Theory of mind*

As it is well known, the term theory of mind refers to the capacity to attribute certain independent mental states, contents *and processes* to others – such as desires, concepts, intentions and emotions. The functioning of the theory of mind enables us to perceive others as distinct physical and mental entities, to acknowledge their inner world that guides their behavior, but is hidden from the senses (Astington, 2003).

Many researchers hold that the attribution of mental states evolves through a several-year-long maturing process from such cognitive precursors as mutual attention, social imitation and pretend play (Baron-Cohen, 1991; Stone, Baron-Cohen, & Knight, 1998). Much less do we know about adult mentalizing ability and the role it plays in social relations. From the few studies available, it is worth highlighting the research of Kinderman, Dunbar, and Bentall (1998). This research revealed that individual differences in mentalizing ability are not attributable to individual variances in working memory capacity. The findings also lead to the conclusion that the cognitive skills required for understanding the mental contents of a person differ from those necessary for recalling the factual events related to this person. Moreover, it seems that mindreading is restricted by strict cognitive limits; beyond a certain level of complexity the great majority of adults find it difficult to follow what people think of one another's mental activities.

1.2. *Mindreading capacity and social skills*

It is clear from the above that theory of mind plays a pivotal role in our social lives. When we engage in social interactions with others, we make constant observations and inferences concerning their mental states. These observations and inferences enable us to explain others' behavior by detecting the underlying motivations; to make predictions for their future actions; what is more, our own behavior and attitudes towards other people are shaped by these activities (Astington, 2003). The close connection between theory of mind and social skills is well demonstrated by the investigations involving people living with autism (Langdon, 2003). It is well known that they have serious deficiencies in recognizing facial expressions, understanding others' emotions, and interpreting subtle differences and elements of social interactions. A number of theorists attribute these deficiencies to their poor mindreading skills (Baron-Cohen, Leslie, & Frith, 1985).

The advanced capacity of mindreading brings advantage in two important areas of interpersonal relations (Davis & Stone, 2003; Slaughter & Repacholi, 2003). First, it makes it easier to cooperate with others by facilitating the development of mutual attunement among the group members, which is a prime necessity for successful cooperation. Second, a well-developed ability to attribute mental states to others enhances competitive skills as it enables individuals to gain advantageous positions or, in certain cases, manipulate others in order to realize their own goals.

1.3. *Empathy*

Researchers seem to agree that prosocial behavior patterns are based on the capacity to feel empathy (Nichols, 2001). However, it poses certain difficulties that the term empathy does not

have a distinct definition; and the question of what abilities and behaviors constitute empathy is answered from numerous different perspectives (Preston & De Waal, 2002). Recently, a pair of new terms, “cold” and “hot” empathy has been introduced in the field of prosocial behavior (Davis & Kraus, 1991; McIllwain, 2003). Cold empathy is fundamentally based on cognitive processes: with its use we are able to understand how the other person feels, and to comprehend what losses, deficiencies and disappointments might have caused their present situation; *but* we do not share their emotional states. This kind of connection is considered as a form of perspective taking, placing ourselves in their situation, without adopting the emotions stemming from it (Davis & Stone, 2003).

“Hot” empathy, on the other hand means that we are able to experience the emotional state of the observed others, and thus feel the urge to come to their assistance. Most researchers agree that it is impossible to understand and experience another person’s emotions and needs without perceiving the events from that person’s point of view, while we are aware of him/her as individual agent distinct from ourselves (Davis & Stone, 2003). At the same time, many theorists argue that neither high level cognitive processes (mindreading) nor the capacity of affective experiencing (empathy) are prerequisites for prosocial behavior (Astington, 2003). One might understand other’s emotions or desires without experiencing these affects; and taking over the other person’s emotions might not necessarily lead to altruistic behavior. Still, we consider it plausible that the advanced mindreading ability coincides with high level of cooperative skills and empathic concern. The development of complex representations concerning the mental states (distress, anxiety, needs) of persons in need often emerges together with the process in which the observer’s point of view and role taking becomes more elaborate. The development of these capacities may feasibly lead to the appearance of altruistic behavior. On the basis of this reasoning it seems probable that people with above average mentalizing level manifest greater willingness to assist others.

1.4. Machiavellianism

It has been stated above that within the sphere of social behavior mindreading ability can play a pivotal role not only in cooperation but also in competing with and manipulating others. Machiavellianism is defined as a behavior in which an individual uses another person as an instrument for achieving his/her goals (Byrne & Whiten, 1988; Christie & Geis, 1970; Linton & Wiener, 2001; Wilson, Near, & Miller, 1996).

Machiavellianism involves a kind of worldview and of the application of certain behavioral methods and tactics (Gunnthorsdottir, McCabe, & Smith, 2002; McIllwain, 2003). Machiavellian people characteristically attribute negative intentions to others and do not expect cooperation from them; they start out from the assumption that others will exploit them, if they themselves fail to do so (Repacholi, Slaughter, Pritchard, & Gibbs, 2003; Wilson, Near, & Miller, 1998). They are capable of distracting themselves from the emotional effects of situations. They remain “cool-blooded” even in emotionally highly charged situations, and do not take over the excitement of others involved (McIllwain, 2003; Wilson et al., 1996). This emotional coldness contributes again to the successful manipulation of others. However, it also shows that Machiavellian individuals are likely to have decreased motivation for the above-mentioned hot empathy and for the affective attunement with other people. Certain studies even argue that it is not only that they are able to detach themselves from others’ emotions; they even lack the capacity to recognize these emotions. According to

a number of research results, there is a negative correlation between the level of Machiavellianism and the capacity to recognize and identify emotional features on others' faces (McIllwain, 2003).

The lack or the decreased level of empathic concern raises the question of how well Machiavellian people are able to attribute mental states. A recent study (Repacholi et al., 2003) did not find significant difference in psychological understanding between High Mach and Low Mach children (although there remains the possibility that, using a more accurate method, children with higher level of Machiavellianism would show superior mindreading). Other empirical data seems to support the assumption that Machiavellians are excellent mindreaders (Davis & Stone, 2003; Sutton, 2001). This is clearly comprehensible, as without advanced theory of mind it is hardly possible to manipulate others successfully, and to recognize in them weak points that they themselves might not be aware of. It seems almost certain that there are strong connections between mindreading and Machiavellianism. This presumption is supported by empirical results, which conclude that bullying children who regularly mock, harass and intimidate their peers, achieve surprisingly high scores in theory of mind tasks, while they tend to ignore the suffering of their victims (Sutton, 2001).

2. Hypotheses

Considering the above, it seems intuitive to suggest that theory of mind plays a central role in the regulation of social relations. It is a determining factor in the functioning of both our cognitive and affective architecture, but it depends on a number of other factors whether it triggers pro- or antisocial behavior. To be more precise, this capacity enables us to be successful either in cooperation, or competition and exploitation. The aim of our investigation is to study certain aspects of the complicated relation of theory of mind and the forms of social behavior which have not received adequate attention in the research studies of the related subject. We intend to test the following three hypotheses.

Hypothesis 1: We hypothesize that there exists a reverse correlation between the extent of cooperative tendencies and the level of Machiavellianism. We expect to find that individuals with strong inclination to manipulate and exploit others show a low level of cooperativeness, whereas people with weaker tendency towards Machiavellian thinking manifest higher level of cooperative dedication.

Hypothesis 2: We presume that there is a strong correlation between the extent of cooperative tendencies and the level of the theory of mind. We expect to find that people who show cooperative intention to a greater extent have higher-level mental state attribution capacity. This is probable, because people who excel in understanding others' thoughts and emotions find it easier to place themselves in a social interaction and initiate mutual support with those they find worth taking this effort for. This is especially true for empathic concern: people who have advanced mindreading skills – thus they are more successful in experiencing and understanding others' hardships – are supposedly more effective in helping others. To our knowledge, this hypothesis has not been put to empirical testing so far.

Hypothesis 3: We assume a positive correlation between the level of Machiavellianism and that of theory of mind. In our expectations, manifestly Machiavellian individuals will show a higher level of mentalizing ability. Our argument is similar to the previous one: we assume that people who can place themselves into others' thoughts and understand their intentions, views and knowledge

more easily, can use this knowledge more effectively to achieve their own goals than people with weaker mindreading capacity. They might also have more inclination to manipulate and exploit others. The supposed reason for this is that they find their ways more easily in the maze of social interactions, thus lowering the costs of cheating and misleading others. This means that individuals who excel in exploiting others, spend less time and energy in these activities, and they can achieve their goals with higher cost/benefit rate of return.

3. Method

3.1. Participants

All participants were volunteer undergraduate university students, aged between 20 and 25 years. The research results include the test results of 127 individuals, 76 females and 51 males.

3.2. Materials

Mindreading ability was tested with comprehension tasks widely used internationally in the investigation of adult theory of mind (Kinderman et al., 1998). The test consists of brief stories, each describes a real life situation, interpersonal relations or conflicts of various degree of complexity. Most of them involve either intended or unintended deception or misleading. Their comprehension requires mindreading at different levels of intentionality. The stories are followed by questions, also representing different rate of intentionality. Each question contains two statements, a true and a false one, and participants had to choose between them. For example, based on the story participants had to decide whether A thinks that B believes that C is lying, or A thinks that B does not believe that C is lying.

One of the first adult mindreading tests was validated by Kinderman et al. (1998) in the original publication. Our test battery consists of 14 stories (and 53 related questions); a part of these was created by our research team, the other part was adapted from Kinderman et al. (1998). In a preliminary study, in which 30 undergraduate students were tested, scores of our test closely correlated with the scores of the original Kinderman et al.'s test ($r = 0.76$, $p < 0.001$).

Besides questions referring to mental states, some of the questions enquire about factual details of the story. These questions ($N = 19$) were included in order to ensure that any failure to answer mental state questions correctly were not simply due to the participant's lack of attention or impaired memory. If a participant scores equally low or high both in theory of mind and factual type of questions, it is probable that both functionings depend on the state of a common cognitive capacity – e.g. the memory capacity. Whereas, if there is no relation between the two scores, it is right to assume that we have tested the individual differences of mindreading and not other intellectual abilities. It is worth noting that our study did not aim to compare mental and factual states, but checked whether any failure to answer mental state questions correctly is due to failure to remember the facts of the story. Naturally, these questions assessing factual memories were not included in the computation of the mindreading score.

We assessed the level of Machiavellianism by the Mach-IV test developed by Christie and Geis (1970). This test consists of 20 statements. The participants were asked to mark on a seven-grade

Likert-type scale the extent they agree with the statements: “strongly disagree” (1) and “fully agree” (7) marked the two extremes. In the 1970s and 1980 many experiments confirmed the internal consistency and the predictive validity of Mach-IV that is now widely used in personality, social and evolutionary psychology (Fehr, Samson, & Paulhus, 1992).

For assessing the level of social cooperation skills the Social Cooperation Scale of Cloninger’s Temperament and Character Inventory (TCI) test was used (Cloninger, Przybeck, Svrakic, & Wetzell, 1994). Its validity has been widely established both in normal and patient samples (Giancola, Zeichner, Newbolt, & Stennett, 1994; Puttonen, Ravaja, & Keltikangas-Jarvinen, 2005). TCI evaluates seven higher order personality or behavior traits. Cooperativeness is a multifaceted, higher order character trait that consists of the following five aspects or lower order traits: Social Acceptance/Social Intolerance, Empathy/Social Disinterest, Helpfulness/Unhelpfulness, Compassion/Revengefulness, Pure Hearted Principles (Integrated Conscience)/Self-serving Advantage. Participants were provided with statements (42 items) referring to themselves; and were asked to decide whether those were valid for them or not. By using various criteria, the Cooperativeness scale of TCI was found to be moderately to highly reliable (Cloninger et al., 1994).

3.3. Procedure

We conducted the test individually with each participant. The stories were read out individually and in a random order to the participants, then they were given an answer sheet where they had to mark the statements that they considered corresponding to the events read. The time for completing the tests and the answer sheets was not restricted. In order to avoid a cumulative effect of processing the sentences along increasing intentionality levels, participants were given sentences in a different order. For each participant, the proportions of incorrect answers to the total of 72 (TOM and memory) questions were calculated.

4. Results

4.1. Theory of mind and factual memory

Scores for all 127 participants revealed a mean of 8.78 theory of mind errors for the 53 questions ($SD = 3.82$). The mean number of memory errors was 1.41 for the 19 questions ($SD = 1.27$). Calculating proportions of incorrect answers to theory of mind and memory questions for all participants, there was still a significantly higher proportion of TOM errors than memory errors ($F[1, 73] = 51.01$, $p < 0.001$). No connection was found between the incorrect scores of tasks assessing mentalizing ability and those of assessing factual memory ($r = -0.03$, $p > 0.05$), suggesting that participants who made larger number of Tom errors did not make also more memory errors. It is worth noting, again, that the only goal of measuring factual memory was to check whether any failure to answer mental state questions correctly is due to failure to remember the facts of the story. The result suggests that the capacity to understand others’ intentions, thoughts or emotions referring to a third or fourth person does not primarily depend on our capacity to recall events and characters in a story. Consequently, if we find close correlation between mindreading and certain interpersonal relations, we are not necessarily to suppose that their relationship is conveyed by the memory capacity.

4.2. Social cooperation and Machiavellianism (first hypothesis)

A strong negative correlation was found between the scores of the Mach-IV test (mean = 3.75, SD = 0.65) and the scores of TCI Cooperativeness subscales (mean = 0.72, SD = 0.13) ($r = -0.62$; $p < 0.001$). As Fig. 1 shows, the higher their level of Machiavellianism, the less willingness they show to cooperate with others. When we divided the participants into two groups that were above and below the mean of Mach-IV scores (4), we found that individuals with low and high levels of Machiavellianism differed significantly in terms of their social cooperativeness ($t = 2.21$, $p < 0.05$).

Correlations were also calculated for Machiavellianism and the different subscales of the Cooperativeness scale. The results show that there is a strong negative correlation between the scores of Machiavellianism (mean = 3.75, SD = 0.65) and the scores of the fourth subscale, Compassion/Revengefulness (mean = 0.66, SD = 0.25) ($r = -0.51$; $p < 0.001$); as well as the scores of the fifth subscale, Pure Hearted Principles (Integrated Conscience)/Self-serving Advantage (mean = 0.75, SD = 0.17) ($r = -0.49$; $p < 0.001$). There also exists a negative correlation between Machiavellianism and the other three subscales that is less close but still significant (Social Acceptance/Social Intolerance (mean = 0.75, SD = 0.24): $r = -.23$, $p < 0.05$; Empathy/Social Disinterest (mean = 0.69, SD = 0.22): $r = -.32$, $p < 0.01$; Helpfulness/Unhelpfulness (mean = 0.71, SD = 0.15): $r = -.31$, $p < 0.01$).

4.3. Theory of mind and social cooperativeness (second hypothesis)

We found a medium-level negative correlation between the number of incorrect answers of the theory of mind test (mean = 8.78, SD = 3.82) and the aggregate scores of the TCI Cooperativeness Scale (mean = 0.72, SD = 0.13) ($r = -0.340$; $p < 0.01$). Consequently, as Fig. 2 shows, the better mindreading capacity individuals have, the more willing they are to cooperate with others.

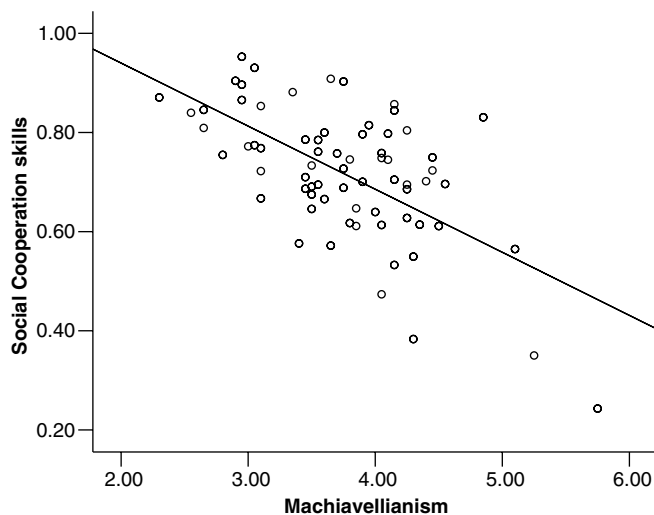


Fig. 1. The relationship between social cooperation skills and manipulative behavior (Machiavellianism). The former was measured by the Social Cooperativeness Scale of Cloninger's TCI test, for the latter Mach-IV test was used.

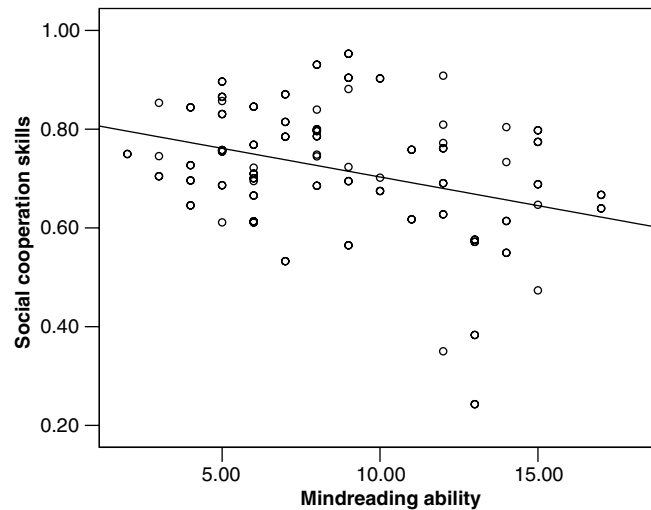


Fig. 2. Social cooperation skills as a function of the number of incorrect answers in the theory of mind test. Mindreading ability was tested with a comprehension task consisting of 14 stories that involved intended or unintended deception.

Statistical analysis was also carried out concerning the relationship between theory of mind and each subscale of the TCI Cooperativeness Scale. The output was a significant negative correlation between the error scores of the adult mindreading test and scores of the second subscale, Empathy/Social Disinterest (mean = 0.69, SD = 0.22) ($r = -0.403$; $p < 0.001$); and the fifth subscale, Pure Hearted Principles (Integrated Conscience)/Self-serving Advantage (mean = 0.75, SD = 0.17) ($r = -0.353$; $p < 0.05$). Consequently, good mind readers are presumably more empathic and conscientious with others than those with poorer mindreading ability.

4.4. Theory of mind and Machiavellianism (third hypothesis)

The results did not confirm our third hypothesis concerning the positive correlation between Machiavellianism (mean = 3.75, SD = 0.65) and theory of mind (mean = 8.78, SD = 3.82). There was no significant correlation between the error scores of adult mindreading test and the Mach-IV test ($r = -0.073$, $p > 0.05$). Consequently, we could not establish that individuals who are apt to manipulate, use and mislead others have more developed mindreading skills than those who show less Machiavellianism in their social relations (see Fig. 3).

5. Discussion

The present study found a close negative correlation between cooperativeness and Machiavellianism among adults. This result was not unexpected as in our introduction of the theoretical background we discussed that Machiavellian people tend to exploit others, regardless of the consequences concerning those exploited. Other investigations have also revealed that Machiavellian

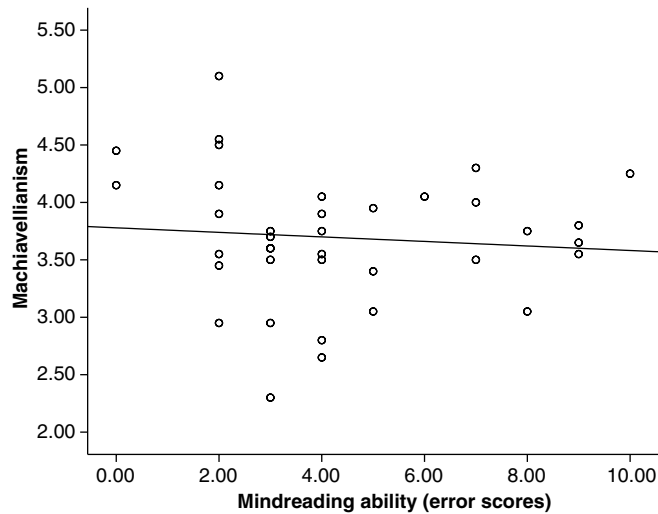


Fig. 3. Machiavellianism as a function of the number of incorrect answers in the adult theory of mind test.

individuals were apt to take serious revenge for others' offences, even if the offenders confessed those (Wilson et al., 1996).

This study goes some way to establishing a connection between adult theory of mind and social cooperativeness. The results confirm our second hypothesis: the level of an individual's mindreading capacity is in close correlation with the probability that he/she engages in cooperative interactions with others and provides support for those who need it. As it was mentioned in the introduction, outstanding mindreading enhances the formation of attunement between two persons, which is necessary for successful cooperation. In this process the capacity to take others' perspectives without losing the sense of our distinctness – i.e. the “cold empathy” – plays an important role. It is not surprising then, that these two features – the capacity to attribute mental states to others, and cooperativeness co-occur. However, it remains for future research to establish, how mindreading influences or shapes “hot empathy”, i.e. the capacity to experience the emotional state of the observed others, and thus feel the urge to help them.

The individual differences of mindreading capacity related to social skills does not seem to be attributable to individual variances in memory capacity. Our results did not find an association between the incorrect scores of tasks assessing mentalizing ability and those of assessing the capacity of recalling factual events of the story. In other words, theory of mind is a specific capacity that is partly independent from other intellectual processes. As such, it can serve as a basis for various social activities in both a cooperative and manipulative context.

Our results contradict the expectations of our third hypothesis, as they do not show a connection between theory of mind and Machiavellianism. Although this result corresponds with Repacholi et al.'s (2003) findings, in the light of the relevant theoretical foundations and other empirical studies (Davis & Stone, 2003; Sutton, 2001), it seems to be a rather unexpected outcome. However, there are several explanations for the interpretation of the lack of connection.

In the theoretical introduction we have argued that theory of mind is a multifaceted capacity. From our viewpoint, differentiating between the emotional and cognitive aspects of the theory of

mind and considering that their development may have individual differences is of utmost importance, and has explanatory power. Research into the aspects of antisocial personality has revealed that the lack of empathy is a central personality characteristic of individuals suffering from sociopathy; still, they are good at manipulating others, at least in short terms (Hare, 1993; Mealey, 1995). It is probable that their emotional mindreading is considerably underdeveloped or even missing, whereas their cognitive mindreading functions well above the average (Blair, 2003). In general, attributing mental states and taking over others' perspective is a necessary – but not sufficient – prerequisite for the formation of empathy itself. The sufficient condition for empathic concern is the ability to place oneself in others' situation and experience their emotions (Davis & Stone, 2003).

These two types of mechanisms – “hot” and “cold” empathy – seem to be divided in the case of Machiavellian individuals. Certain authors suppose that while Machiavellian people can represent others' thoughts and intentions, they are unable to comprehend emotional states, especially those defined as “moral emotions”, such as guilt, shame or sympathy (Blair, 2003; Davis & Stone, 2003). They are well aware of the impact their behavior might have on others, still this knowledge does not trigger the motive of care for others. It is more than possible that the stories of the theory of mind test we used in our investigation are primarily organized around the mental states of the protagonists, and the test assesses precisely the understanding of these emotions. If it is so, this can provide an answer for the question of why Machiavellian people with a high level of “cold” empathy are not good mind readers.

However, it is also possible – and scarce data supports this assumption – that the mindreading capacity of Machiavellian people is not below average at all (Repacholi et al., 2003). It seems more probable that they are better at controlling their emotions, especially in situations when these collide with their personal aims. Consensually, cynical, Machiavellian people often find excuses for their actions by claiming that others are unreliable and they would similarly resort to cheating in the given situation (Davis & Stone, 2003). Consequently, it is possible that in our experiment high level of Machiavellianism did not co-occur with similarly high level of mindreading, because the former impeded the normal expression of the latter. A related assumption is that Machiavellians with a good skill in cold empathy lack the desire or motivation to feel what others are feeling. Naturally, testing these assumptions requires further research, primarily such investigations that analyze the participants' manipulative or cooperative behavior in real-life situations rather than paper-and-pencil tests.

References

- Astington, N. J. (2003). Sometimes necessary, never sufficient: False-belief understanding and social competence. In B. Repacholi & V. Slaughter (Eds.), *Individual differences in theory of mind. Macquarie monographs in cognitive science* (pp. 12–38). Hove, E. Sussex: Psychology Press.
- Baron-Cohen, S. (1991). Precursors to a theory of mind: Understanding attentions in others. In A. Whiten (Ed.), *Natural theories of mind* (pp. 233–252). Oxford: Blackwell.
- Baron-Cohen, S., Leslie, A., & Frith, U. (1985). Does the autistic child have a theory of mind? *Cognition*, 21, 37–46.
- Blair, R. J. R. (2003). Did Cain fail to represent the thoughts of Abel before he killed him? The relationship between theory of mind and aggression. In B. Repacholi & V. Slaughter (Eds.), *Individual differences in theory of mind. Macquarie monographs in cognitive science* (pp. 143–170). Hove, E. Sussex: Psychology Press.

- Byrne, R., & Whiten, A. (1988). *Machiavellian intelligence. Social expertise, and the evolution of intellect in monkeys, apes, and humans*. Oxford: Clarendon Press.
- Christie, R., & Geis, F. (1970). Scale construction. In R. Christie & F. Geis (Eds.), *Studies in Machiavellianism* (pp. 388–400). New York: Academic Press.
- Cloninger, C. R., Przybeck, T. R., Svrakic, D. M., & Wetzler, R. D. (1994). *The temperament and character inventory (TCI): A guide to its development and use*. Washington: Center for Psychobiology of Personality.
- Davis, M., & Kraus, L. A. (1991). Dispositional empathy and social relationships. *Advances in Personal Relationships*, 3, 75–115.
- Davis, M., & Stone, T. (2003). Synthesis: Psychological understanding and social skills. In B. Repacholi & V. Slaughter (Eds.), *Individual differences in theory of mind. Macquarie monographs in cognitive science* (pp. 305–352). Hove, E. Sussex: Psychology Press.
- Fehr, B., Samson, D., & Paulhus, D. R. (1992). The construct of Machiavellianism: Twenty years later. In C. D. Spielberger & J. N. Butcher (Eds.), *Advances in personality assessment* (pp. 77–116). Hillsdale, NJ: Erlbaum.
- Giancola, P. R., Zeichner, A., Newbolt, W. H., & Stennett, R. B. (1994). Construct validity of the dimension of Cloninger's tridimensional personality questionnaire. *Personality and Individual Differences*, 17, 627–636.
- Gunnthorsdottir, A., McCabe, K., & Smith, V. (2002). Using the Machiavellianism instrument to predict trustworthiness in a bargaining game. *Journal of Economic Psychology*, 23, 49–66.
- Hare, R. D. (1993). *Without conscience: The disturbing world of the psychopaths among Us*. New York: Guilford.
- Kinderman, P., Dunbar, R. I. M., & Bentall, R. P. (1998). Theory-of-mind deficits and causal attributions. *British Journal of Psychology*, 89, 191–204.
- Langdon, R. (2003). Theory of mind and social dysfunction. Psychotic solipsism versus autistic asociality. In B. Repacholi & V. Slaughter (Eds.), *Individual differences in theory of mind. Macquarie monographs in cognitive science* (pp. 241–269). Hove, E. Sussex: Psychology Press.
- Linton, D. K., & Wiener, N. I. (2001). Personality and potential conceptions: Mating success in a modern Western male sample. *Personality and Individual Differences*, 31, 675–688.
- McIllwain, D. (2003). Bypassing empathy: A Machiavellian theory of mind and sneaky power. In B. Repacholi & V. Slaughter (Eds.), *Individual differences in theory of mind. Macquarie monographs in cognitive science* (pp. 39–66). Hove, E. Sussex: Psychology Press.
- Mealey, L. (1995). The sociobiology of sociopathy: An integrated evolutionary model. *Behavioral and Brain Sciences*, 18, 523–599.
- Nichols, S. (2001). Mindreading and the cognitive architecture underlying altruistic motivation. *Mind and Language*, 16, 425–455.
- Preston, S. D., & De Waal, F. B. M. (2002). Empathy: Its ultimate and proximate bases. *Behavioral and Brain Sciences*, 25, 1–72.
- Puttonen, S., Ravaja, N., & Keltikangas-Jarvinen, L. (2005). Cloninger's temperament dimensions and affective responses to different challenges. *Comprehensive Psychiatry*, 46, 128–134.
- Repacholi, B., Slaughter, V., Pritchard, M., & Gibbs, V. (2003). Theory of mind, Machiavellism, and social functioning in childhood. In B. Repacholi & V. Slaughter (Eds.), *Individual differences in theory of mind. Macquarie monographs in cognitive science* (pp. 99–120). Hove, E. Sussex: Psychology Press.
- Slaughter, V., & Repacholi, B. (2003). Introduction: Individual differences in theory of mind. What are we investigating? In B. Repacholi & V. Slaughter (Eds.), *Individual differences in theory of mind. Macquarie monographs in cognitive science* (pp. 1–12). Hove, E. Sussex: Psychology Press.
- Stone, V. E., Baron-Cohen, S., & Knight, R. T. (1998). Frontal lobe contributions to theory of mind. *Journal of Cognitive Neuroscience*, 10, 640–656.
- Sutton, J. (2001). Bullies: Thugs or thinkers? *The Psychologist*, 14, 530–534.
- Wilson, D. S., Near, D., & Miller, R. R. (1996). Machiavellianism: A synthesis of the evolutionary and psychological literatures. *Psychological Bulletin*, 119, 285–299.
- Wilson, D. S., Near, D., & Miller, R. R. (1998). Individual differences in machiavellians as a mix of cooperative and exploitative strategies. *Evolution and Human Behavior*, 19, 203–212.