BABEŞ-BOLYAI UNIVERSITY

APPLIED COGNITIVE PSYCHOLOGY DOCTORAL SCHOOL

Ph.D. THESIS SUMMARY

DECIPHERING DECEPTION AND EMOTION

(IN)AUTHENTICITY CUES ACROSS THE LIFESPAN

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2022

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Keywords: authenticity of emotional expressions, development, emotion recognition, emotion understanding, attitudes toward deception, lie acceptability, social information processing, anxiety

CHAPTER 1. INTRODUCTION

1.1 Motivation and conceptual definitions

An important part of social functioning refers to people accurately detecting the social cues revealed by others, whether this refers to the content of the communication or the authenticity of emotional cues others display. This enhances communication, trust and smoothens social relationships (Keltner & Haidt, 2001). Making accurate judgments about people's mental states and emotions is essential in order to understand and function in the social world (Rieffe, Meerum Terwogt, & Cowan, 2005). Children have to comprehend that people's representation of reality (reflected in their theory of mind) is what guides their behavior (Sidera, Serrat, Rostan, & Sanz-Torrent, 2011). Therefore, children's understanding of the distinction between appearance and reality, and comprehension of the fact that thoughts, actions and emotions can be hidden becomes particularly important. It is this very understanding and its complexity which also generates their positioning towards truth and inauthenticity, resulting in a more lenient or a stricter attitude towards the person attempting to conceal their true thoughts or emotions. Therefore, the present thesis is aimed to elucidate two important aspects of social information processing: attitudes towards deception, and perceptions of the authenticity of emotional cues such as emotional expressions.

1.1.1. Lie acceptability and attitudes towards deception

Lying is viewed as reprehensible and undesirable, yet, at the same time acknowledged as a necessary and acceptable behavior under certain socially sanctioned circumstances. It is a pervasive phenomenon, as most individuals lie at least once or twice a day (Kashy & DePaulo, 1996; Serota, Levine, & Bester, 2010).

Lie acceptability, defined as "a person's generalized evaluation of the practice of deception" (Oliveira & Levine, 2008, page 283) represents an attitude that varies along a

continuum, from perfectly acceptable to completely unacceptable lies. Some studies conceptualized lie acceptability as unitary and unidimensional, investigating whether or not people have a negative or positive attitude toward deception overall (Levine et al., 1992; Oliveira & Levine, 2008; Goosie, 2014). Other studies showed that *different types of lies can elicit different attitudes* (Erat & Gneezy, 2012; Glätzle-Rützler & Lergetporer, 2015; MacLeod & Genereaux, 2008; Lundquist, et al., 2009). Lies which are more prosocial in nature are generally considered more acceptable, while antisocial or self-gain lies are considered less acceptable (Levine & Schweizer, 2014; Webley & Burke, 1984). As children become more proficient in their lie-telling so do their perceptions of deception become more nuanced (Lee, 2013; Talwar et al., 2016). Children must learn to evaluate lie-telling differently based on the intentions and conventions of the social context, which can sometimes prove to be contradictory.

1.1.2. Perceptions of emotional (in)authenticity cues

Facial expressions do not always genuinely reflect the real emotion behind them. An individual might smile when greeting someone without experiencing a strong emotion, or they might put on a sad face in order to play a pretend game with a child. Understanding the difference between authentic and inauthentic expressions is therefore very important socially (Thibault et al., 2009). There has been recent interest in researching the authenticity of emotional expressions and the way people might detect this authenticity. Although most work has focused on real and false expression for happiness (Gunnery & Ruben, 2016) there is an increasing number of studies looking into the authenticity of expressions for negative emotions as well (Dawel, Palermo, O'Kearney, & McKone, 2015; Douglas, Porter, & Johnston, 2012; McLellan & McKinley, 2013).

There are three ways in which a person can manipulate their emotional expressions, which results in several *different types of emotional expressions based on the distinction*

between the real, felt emotion and the apparent, expressed one (Porter & ten Brinke, 2008). Authentic expressions are congruent; the person displaying them feels a certain emotion and freely expresses that emotion outwardly. Inauthentic expressions can either be simulated (when the person has a neutral emotional state, yet displays a certain emotion; e.g., smiling politely when one does not feel particularly good or bad) or masked (when the person has a certain emotion, yet displays another; e.g., expressing a polite smile when one feels actually sad). Expressions can also be suppressed, when a person is hiding an experienced emotion behind a neutral outward expression (Ekman & Friesen, 1975; Porter & ten Brinke, 2008).

1.2 The integrated model of emotion processes and cognition in social information processing

In order to frame the concepts of the thesis we rely on the ***Integrated model of emotion processes and cognition in social information processing*** formulated by Lemerise and Arsenio in 2000. The model is based on social information processing theory and aims to describe in detail how children's understanding and interpretation of certain social situations impacts their subsequent behavioral responses.

As such, children approach a social situation with *database of memories of past experiences* which comprises important information about learned social norms, social schemas and acquired rules (Crick & Dodge, 1994). Emotion processes are fundamental in interpreting social cues and include elements pertaining to emotional states and mood, temperament and emotion regulation. In addition, the model includes 6 distinct steps that interconnect with the memory database and the aforementioned emotion processes: 1) *encoding of social* information; 2) *interpretation of cues*; 3) *clarification of goals*; 4) *response access;* 5) *response decision*; and 6) *behavioral enactment*.

Based on the workings of the integrated model we aim to explain the main concepts of the thesis and their connection to other socio-emotional factors such as anxiety or social desirability. Therefore, we include *recognition of the authenticity of emotional expressions* in this model as a specific facet of emotion recognition; belonging to the first step in the model, encoding of cues. Identifying the authenticity behind someone's emotional expression relies on social knowledge stored in the database, such as children's understanding of the fact that emotions can be hidden (Kromm et al., 2015, Sidera et al., 2011). Based on authenticity judgments, children can modify how they interpret emotional and social cues and they can chose and implement different responses.

The thesis also focuses on *children and adults' attitudes towards deception*, which we view as part of the second step, the interpretation of cues. In the process of drawing conclusions about others, children make assessments of other's honesty in order to establish potential trust (Talwar & Crossman, 2011; Talwar, Williams, Renaud, Arruda, & Saykaly, 2016). Individuals rely on acquired rules and social knowledge (Talwar & Crossman, 2011) when judging deception. The attitudes they form about deception also inform social decision making and subsequent behavior. For instance, people with negative views about antisocial lies might choose to avoid a person who employs such deceptive communication.

1.3. Methodological limitations and opportunities

1.3.1. Attitudes towards deception

Attitudes toward deception have been assessed with a variety of different measures, which usually include *interviews and vignettes*, for young children (Talwar & Crossman, 2011; Talwar et al., 2016). We focused our attention on broader measures of attitudes towards deception, looking into *questionnaires that could be used across different age groups*. The reliability of such instruments might be questioned (would individuals, especially children,

answer honestly about their dishonesty?). Preliminary results validate the use of such questionnaires, linking self-reported frequency of lying and deceptive behavior (Brasher et al., 2014; Halevy et al, 2014; Oliveira & Levine, 2008). While there is some concern regarding children's ability to report their own deception, the results of Talwar and Lee (2008) suggest children as young as 3 are able to admit to their own lie-telling.

Lundquist et al. (2009) devised a *questionnaire* with 10 items assessing adults' attitudes towards various types of lies. They examined people's views about white lies and whether or not they believed degrees of lying exist. They also examined attitudes towards various types of lies, for instance *prosocial* and *self-interested* lies. The questions in the Lundquist et al. questionnaire also referred to individuals' inclination to lie when they *risk discovery* and their perception of lying even when one *promises to tell the truth*. Given the great variability in types of deception being evaluated, we chose to adapt this questionnaire and use it with the adults and children involved in our study.

Another measure frequently used in deception research is the *Revised Lie acceptability Scale* adapted by Oliveira and Levine in 2008. As opposed to other measures, this one was specifically created to assess lie acceptability as a unitary concept and includes a final list of 11 items, including statements such as "Lying is no big deal." and "Lying is just wrong.". Given its validity and sound theoretical background we also included this measurement in the current thesis, specifically in Study 2.

1.3.2. Identifying the authenticity of emotional expressions

Some earlier studies involved more experimental procedures to assess adults' ability, such as *artificially morphed faces* (Iwasaki & Noguchi, 2016). Other studies, especially ones that view inauthentic emotional expressions as deceptive involved *coding micro expressions* based on certain action units (Porter & ten Brinke, 2008; ten Brinke, MacDonald, Porter &

O'Connor, 2012). These procedures are however not reflective of the way individuals would express emotions in real life and rely on highly artificial and manipulated stimuli, which have recently been criticized (Barrett, Adolphs, Marsella, Martinez, & Pollak, 2019).

Another way to evaluate children's understanding of the authenticity of emotional expressions is to investigate their conceptual *comprehension of hidden emotions*. In order to evaluate children's level of emotion understanding the *Test of Emotion Comprehension* (Pons & Harris, 2000) is widely used. It assess nine components of emotion comprehension, regarding the nature of emotions, the causes of emotions and the possibility to control emotional expressions, having a specific item that measures if *children understand the possibility of hiding* an emotion and if they can *recognize the underlying emotional state*.

More recent studies, especially the ones investigating children's understanding of the authenticity of emotional expression have relied on a set of stimuli created specifically to assess this ability. *The McLellan pictures* (McLellan, Johnston, Dalrymple-Alford, & Porter, 2010) show both genuine and false expression of happiness, sadness, and fear, as well neutral expressions. This is the only set of stimuli that assessed the actual emotion felt by the individuals displaying the photos. In order to elicit affective reactions the people portraying the expressions were presented with emotionally evocative photos and sound excerpts. Then, they received instructions to generate either posed or genuine affective displays. While the resulting images are very valuable, having been the basis for assessments in other studies, they have certain limitations. Due to the methods used to create and verify them, the identities of the displayers are not the same across different expression categories.

In 2016 study, Dawel et al. created *ratings of perceived authenticity for several stimuli from existing, widely used, facial expression databases*, thus generating 2 new *pictorial stimuli sets*: one their participants perceived as genuine, (based on event elicitation) and another set their participants perceived as fake, from posed sources. These sets were composed from

various sources, therefore they have similar limitations with the McLellan pictures (McLellan et al., 2010), having different displayers showcasing different types of expressions, with images being dissimilar in terms of gaze, size, background and size across sources. Furthermore, since some images are elected from databases created by posing expressions, the results sets do not have an assessment of the underlying emotions of the displayers.

Given these methodological caveats, the third study of the thesis focuses on creating a new database of stimuli containing more ecologically valid stimuli of authentic and inauthentic emotional expressions.

1.4. Aims and research questions

The main scope of the thesis was to investigate social and emotional processes related to the encoding and interpretation of social cues, focusing specifically on *children and adults' perceptions of deception,* as well as on their *interpretation of the authenticity of emotional expressions*. Therefore, we aimed to track developmental changes related to the perception and attitudes toward deception and the perception and recognition of the authenticity of emotional expressions. Our overarching goal was to integrate these two concepts and relate them to other components described by the Lemerise and Arsenio model (2000). As such, we investigated the connection with emotion processes such as anxiety or sensation seeking, as well as social relationship quality and prosocial behavior.

Specifically referring to the *perceptions of deception concept*, we aimed to study the developmental trajectory in people's attitudes toward deception, and investigate the relationship between attitudes, self-reported likelihood and frequency of deceit across a variety of imaginary contexts. We were interested in the way *individual differences in 3) anxiety, 4) social desirability and 5) sensation seeking are involved in the complex interplay between perceptions about deception and frequency of deception across development*. Lastly, from a

more exploratory standpoint, we 6) investigated children's perception about school, relationship with parents and peers in connection to their lie acceptability.

Referring to the **perception of emotional (in)authenticity cues**, our aim was twofold. We first created *an ecologically valid database of stimuli for authentic and inauthentic emotional expressions* in order to improve assessment methods. We then investigated children's perceptions of (in)authenticity cues and specifically looked into 1) *preschoolers' ability to identify the authenticity of happiness and sadness expressions*, relating it to their social competences, and 2) *primary school children's emotion understanding, especially understanding of the fact that emotions can be hidden*, relating it to their *anxiety*.

CHAPTER II. ATTITUDES TOWARDS DECEPTION AND LIE ACCEPTABILITY ACROSS DEVELOPMENT

2.1 Study 1: A little lie never hurt anyone: Attitudes toward deception across development[1]

2.1.1 Introduction

Lying is viewed as reprehensible and undesirable; yet acknowledged as necessary and acceptable under certain circumstances. This paradox is reflected in *children's attitudes towards deception*; while young children rate all lies negatively, older children rate prosocial lies more positively than antisocial ones (Bussey, 1999; Lavoie et al., 2016; Talwar, et al., 2016). Lundquist et al. (2009) researched people's perceptions of *various types of lies* and showed that individuals are less inclined to lie when risking discovery, or when they promise to tell the truth, and that aversion to lying increases with the strength of the truth promise.

Deceptive behavior emerges during preschool years, as children tell simple lies to avoid

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[1] This study has been published in Psychology in Russia: State of the Art: Buta, M., Visu-Petra, G., Koller, S. H., Visu-Petra, L. (2020). A Little Lie Never Hurt Anyone: Attitudes towards Various Types of Lies over the Lifespan, *Psychology in Russia: State of the Art, 13*(1), 70 - 81.https://doi.org/10.11621/pir.2020.0107

punishment or gain benefits. The development of lying across the lifespan follows an inverted U-shape (Debey et al., 2015; Lavoie et al., 2016; Maggian & Villeval, 2013), suggesting that lying develops in childhood, reaches a maximum in adolescence, and then declines into adulthood. Recent findings associated people's higher acceptance of lying with increases in their *lying frequency* (Halevy, Shalvi & Verschuere, 2014; McLeod & Genereaux, 2008). Children's moral evaluations and understanding of hypothetical deceptive scenarios are related to their lying behavior (Popliger et al., 2011; Talwar & Lee, 2008). Adults who lie frequently tend to view deception less negatively, their attitudes toward lies being linked to the frequency of deceptive behavior (Brasher et al., 2014; Halevy et al., 2014).

Regarding *gender differences*, existing findings are mixed. Among children, boys appear to tell more lies, being more accepting of deception (Goosie, 2014; Jensen, et al., 2004). In adulthood, Ning and Crossman (2007) showed that women rated lies more positively than men, whereas Levine et al. (1992) found that men displayed greater acceptance of lying.

In terms of individual differences in attitudes toward lies *Anxiety* also plays a role in deception. Low anxiety was linked with high lying scores (Eswara & Suryarekha, 1974), and individuals often report anxiety, guilt, and an increased cognitive load when telling a lie (Caso, Gnisci, Vrij, & Mann, 2005; Gozna, Vrij, & Bull, 2001).

Social desirability was linked to lying frequency Kashy and DePaulo's (1996). Visu-Petra et al. (2014) also found that young adults with high impression management were more efficient in their deception (faster deceptive responses). By contrast, Gozna et al. (2001) did not find a significant relationship between lying and impression management.

2.1.1.1. Current study

Our study aimed to 1) track age differences in attitudes toward deception, and 2) investigate the relationship between attitudes, self-reported likelihood of lying, and the frequency of deception across a variety of hypothetical contexts. We were interested how

individual differences in 3) anxiety and 4) social desirability are involved in the complex interplay between views toward deception and lying frequency as people age.

We painted an in-depth picture of *attitudes toward deception* by assessing perceptions of various types of lies: attitudes toward lies (white lies and degrees of lying) and the likelihood of approaching (prosocial and self-interested lies) or avoiding (risk of discovery or breaking a promise) different types of lies. We hypothesized that, across all age groups, more lenient attitudes toward deception would be associated with higher *self-reported lying frequency*.

To our knowledge, our work is the first to study a direct link between *anxiety* and people's view toward deception. We expected children and young adults with higher social anxiety to display less lenient views about deception, and a lower self-reported lying frequency. Additionally, we aimed to relate *social desirability* to attitudes toward deception and lying frequency, examining possible effects as people mature. We predicted that an attitude of higher social desirability would be linked to lower lie acceptability, and to a decreased frequency of self-reported lying.

2.1.2. Methods

2.2.1. Participants

We included 177 Romanian participants from four different age groups: 46 *primary school* children, ages 7 - 11 (mean age = 8.86 years, *SD* = 1.09; 30 boys); 41 *middle school* children, ages 11 - 15 (mean age = 12.85 years, *SD* = 1.39; 19 boys); 49 *high-school* children, ages 15 - 19 (mean age = 17 years, *SD* = 1.35; 17 boys); and 41 *young adults* (mean age = 23.32 years, *SD* = 5.62; 8 men).

2.2.2. Measures

To measure participants' views about various types of lies, we adapted the questionnaire about attitudes toward deception developed by Lundquist et al. (2009) measuring attitudes toward white lies and degrees of lying, self-reported likelihood of engaging in

prosocial or self-interested lies and the likelihood of avoiding a certain type of deceptive behavior: related to risk of discovery, or having promised to tell the truth. We assessed each participant's self-reported frequency of lying with one item on a 4-point Likert scale (never, once, sometimes, often).

The adults completed the impression management subscale of the Balanced Inventory of Desirable Responding (BIDR; Paulhus, 1991). To assess the children's social desirability, we administered the Children's Social Desirability Scale (CSD; Crandall, Crandall, & Katkovsky, 1965). The children also completed the social anxiety subscale of the Revised Children's Anxiety and Depression Scale (Chorpita et al., 2000).

2.1.3. Results

Testing for gender differences on all outcomes, with an independent samples *t*-test, showed that in middle school, boys were more likely to avoid lying when they risked discovery ($M = 2.89$, $SD = 0.94$) than girls ($M = 2.19$, $SD = 0.98$): $t(38) = -2.32$, $p < .05$. High-school girls reported greater social anxiety ($M = 11.44$, $SD = 4.63$) than boys ($M = 7.30$, $SD = 3.29$): $t(47) = -3.27$, $p < .01$. Young adult women were more permissive toward white lies ($M = 2.63$, $SD = .70$) than men ($M = 2.00$, $SD := .76$): $t(39) = -2.28$, $p < .05$), showing lower impression management ($M = 6.33$, $SD = 3.26$) than men ($M = 9.13$, $SD = 3.64$); $t(39) = 2.08$, $p < .05$.

Results of a multivariate analysis of variance (MANOVA) showed that, across various types of lies, there was a significant multivariate effect of age, $F(3, 172) = 6.07$, $p = .001$, partial $\eta^2 = .203$. Univariate tests with Bonferroni corrections showed a significant age effect for *attitudes toward white lies*, $F(3, 172) = 12.08$, $p = .001$, partial $\eta^2 = .180$, but not toward degrees of lying, $F(3, 172) = .33$, *ns*. Bonferroni post hoc tests revealed that children in primary ($M = 1.67$; $SD = .79$) and middle school ($M = 1.70$, $SD = .72$) were less accepting of white lies than high-schoolers ($M = 2.24$; $SD = .78$) and young adults ($M = 2.51$, $SD = .75$).

There was also a univariate age effect for likelihood of telling *self-interested lies* (F(3, 172) = 4.17, p = .007, partial η^2 = .068), but not for *prosocial lies*, (F(3, 172) = 1.52, *ns*). Primary school children reported a lower tendency to tell self-interested lies (M = 1.48; SD = .89) than adults (M = 2.20; SD = .98)

Univariate tests also revealed an age effect on *risk of discovery* (F(3, 172) = 6.33, p = .001, partial η^2 = .099) and on *promises to tell the truth* (F(3, 173) = 4.21, p = .007, partial η^2 = .069). Middle school children (M = 2.53; SD = 1.01) were less likely to avoid telling lies when they risked discovery compared to primary school children (M = 3.24, SD = .97) and adults (M = 3.37, SD = .86). Middle school children also reported a lower tendency to *avoid breaking a promise* (M = 2.98, SD = .86) than adults (M = 3.61; SD = .63). We also found a univariate age effect for self-reported frequency of lying: F(3, 172) = 16.23; p = .001, partial η^2 = .221. Primary school children (M = 1.91; SD = 1.03) and adults (M = 1.71; SD = 1.01) reported lower frequencies than middle-school children (M= 2.68; SD = 1.10) and high-school children (M = 3.00; SD = .96).

For the bivariate correlation results on the frequency of lying, attitudes toward deception, likelihood of deceit, social desirability (impression management in the adult sample), and social anxiety, see *Table 1*. Next, we performed two multiple regression analyses predicting self-reported lying frequency, one for children and adolescents (N = 136), and one for adults (N = 41). See *Tables 2* and *3* for the regression results.

Table 1. Correlations between Attitudes, Likelihood of Lying, Frequency of Lying, Social Desirability, Impression Management & Social Anxiety

	Primary school			Middle school			High-school			Young adults	
	FL	SD	SA	FL	SD	SA	FL	SD	SA	FL	IM
1.White lies	.13	-.15	.03	.32*	-.24	-.05	.39**	-.20	-.01	.28	-.39*
2.Degrees of lying	-.12	.10	-.17	.15	-.15	.09	-.24	-.15	-.15	-.09	.27
3.Prosocial lies	-.06	-.20	.06	.10	-.28	.46**	.06	.02	.07	.04	-.12
4.Self-interested lies	.29	-.08	-.02	.29	-.24	-.23	.28*	-.27	-.06	.31**	-.36*
5.Risk of discovery	-.09	-.25	.35*	.20	-.28	-.07	.00	-.02	.38**	.30	-.26
6.Truth promise	-.30*	.12	-.04	.20	.09	-.07	-.28*	.16	.15	-.11	.24
7.Frequency of lying-typical lies	.	-.52**	.27	.	-.56**	-.06	.	-.19	-.16	.	-.50**

*Note: *p<.05; **p<.01*

FL = Frequency of lying; SD = Social Desirability; SA = Social Anxiety; IM = Impression Management.

Table 2. Regression results predicting frequency of lying from age, social desirability, and deceptive attitudes measurements

	Frequency of telling typical lies – all children (N=136)				
Predictors	B	SE B	β	ΔR²	Cumul. R²
Step 1 (enter method)					
Age group	.01	.09	.01	.00	
Step 2 (enter method)					
Age group	-.33	.08	-.32***	.38***	.37***
Social Desirability	-.08	.01	-.69***		
Step 3 (stepwise method)					
Age group	-.38	.08	-.37***	.02*	.39**
Social Desirability	-.08	.01	-.67**		
Attitudes toward white lies	.22	.10	.16*		
Likelihood of telling prosocial lies	-	-	ns		
Likelihood of telling self-interested lies	-	-	ns		

*Note: *** p<.001; ** p<.01; * p<.05.*

Table 3. Regression results predicting lying frequency from impression management and deceptive attitudes measurements

Predictors	Frequency of telling typical lies – adults (N=41)				
	B	SE B	β	ΔR²	Cumul. R²
Step 1 (enter method)					
Impression management	-.14	.16	-.14	.02	.02
Step 2 (stepwise method)					
Impression management	-.09	.15	-.09	.12*	.33**
Likelihood of telling prosocial lies	.38	.17	.35**		
Attitudes toward white lies	-	-	ns		
Likelihood of telling self-interested lies	-	-	ns		

*Note: ** p<.01; * p<.05.*

2.1.4. Discussion

Our main findings revealed that perceptions about deception change with age: younger children have more negative attitudes toward white lies and a decreased likelihood of telling self-interested lies than older children and adults. Regarding self-reported lying frequency, we found an inverted U-shape trend: primary-school children and adults display a lower frequency than middle-school children and high-schoolers. Additionally, we found gender variations for contextualized views about deception. From the perspective of individual differences, low anxiety was associated with a lower likelihood of telling prosocial lies and a lower likelihood of avoiding risking discovery. Reduced social desirability predicted a higher self-reported lying frequency.

Our investigation into *specific views on deception* uncovered a gradually nuanced acceptance of white lies, as adolescents and young adults became more accepting of *white lies* than younger children. This result is in line with previous studies (Talwar & Crossman, 2011) and suggests adolescents and young adults might have had more direct positive experiences with white lies, reinforcing their more lenient attitudes toward them. Primary school children were less likely to tell *self-interested lies* compared to young adults, potentially supporting the idea that propensity to lie increases with personal gain & decreases the more others stand to lose (Lundquist et al., 2009).

Middle school children showed less *aversion to lies with a risk of discovery* than primary school children, or adults. Increases in reward-seeking behavior, coupled with increased impulsivity, might make younger school-age children more prone to risk-taking than older children and adults (Steinberg, 2010). Middle-school children had a lower *aversion to breaking a promise* than adults; however, they were still unlikely to break the promise. Our study suggests that an explicit promise of honesty leads to a strong aversion to lying, even in the case of younger children.

We found a significant *age effect on self-reported frequency of lying*; primary school children and adults reported fewer lies than middle-school and high-schoolers, which supports the developmental trajectory from other studies (Debey et al., 2015; Lavoie et al., 2016; Talwar & Crossman, 2011). Furthermore, our findings suggest a *connection between perceptions of deception and self-reported frequency of lying*, confirming previous literature on adults (Brasher et al., 2014; Halevy et al., 2014; Serota et al., 2012). Children and adolescents displayed more lenient attitudes toward white lies, and this predicted higher self-reported lie-telling, independent of age effects. For adults, a greater likelihood of telling prosocial lies predicted higher self-reported lying frequency. It is plausible that, with age, attitudes toward lies become more lenient, and this increase in acceptance leads to a higher propensity toward lying. Our results suggest that the acceptability and the context of deception might be involved in determining a person's lie-telling behavior, a deeper knowledge of this phenomenon could aid educational and parental practices for promoting honest behavior.

We also revealed *limited evidence of gender differences* for attitudes toward deception. Middle school girls were more likely to tell lies despite the risk of discovery, and young adult women were more permissive of white lies. Our findings were consistent with other self-report studies (Ning & Crossman, 2007). Also, these gender differences might have appeared because

the young women in our sample displayed lower social desirability, thus being more likely to report permissive attitudes toward deception.

From the perspective of individual differences, our results are the first to suggest that anxiety plays a role in children's attitudes toward deception. Children with low social anxiety might be less likely to avoid discovery when lying because of their lower behavioral inhibition (Gest, 1997; Muris, & Meesters, 2002), and being more inclined to take risks (Steinberg, 2010). *Socially desirable responses* were related to attitudes toward deception and lying frequency; this expands the results of previous research (Kashy & DePaulo, 1996; Visu-Petra et al., 2014). Children and adolescents who are less concerned with the impression they make on others might be more likely to admit to lying.

2.1.4.1. Limitations

The self-report measures we used might not be appropriate to assess people's implicit attitudes and lie-telling. It is also possible younger children found it difficult to report their deceptive behavior and beliefs. Additionally, to assess all participants in an age-appropriate manner, we used different measures of social desirability for children and adults.

2.2. Study 2: Individual predictors of lie acceptability across development[2]

2.2.1. Introduction

The acceptability of lies, either general or domain-specific is significantly shaped by *development*. Lavoie et al. (2016) studied children's reasoning about lies, and showed that 12-15 year-olds believed lying was more acceptable compared to younger children (8-11 year-olds), and

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their motivations for lying become more utilitarian with age. The age-related increase in lie acceptability is also corroborated by previous evidence indicating that very young children identify all false statements as lies, and rate all lies as being negative (Bussey, 1999). However, around the end of elementary school, children's attitudes towards deception change. False statements told to help others are no longer viewed as lies, in contrast to statements told to harm others (Bussey, 1999). By middle childhood, lies to prevent moral transgressions (harm, injustice, unfairness) are judged to be acceptable (Gingo, 2017). By early adolescence, lies to maintain privacy or autonomy are also seen as acceptable (Gingo, 2017). However, both children and adolescents reject lies which cover dangerous behaviors and severe norm violations like self-inflicted harm or serious risk taking (Gingo, 2017).

Oliveira and Levine (2008) devised the Revised Lie Acceptability scale to measure "an individual difference in general attitude toward deceit as a communicative means to achieving personal and social goals" (p. 282). Goosie (2014) was the first to investigate lie acceptability across a wider age, 8 to 19 year-olds with the RLAS, finding no differences in lie acceptability,

There are mixed results regarding *gender* differences in lie acceptability. Oliveira and Levine (2008) found no reliable differences between men and women regarding attitudes toward lying. Engarhos et al. (2019) found no differences between boys' and girls' moral evaluations of truth and lie-telling. In contrast, Goosie (2014) showed greater lie acceptability for boys throughout all the targeted age groups, especially those boys who had self-reported acts of bad behavior.

There is a potential link between a*nxiety* and lie acceptability. Previous results have shown that people reported greater anxiety and guilt when lying (Caso et al., 2005; Gozna, Vrij, & Bull, 2001) and in study 1 we have linked social anxiety to children's attitudes towards different types

of lies. Further research is still needed to clarify the relationship between anxiety and general lie acceptability across development.

Sensation seeking can be hypothesized to play a role in lie acceptability, since it has already been connected to deceptive behavior. Lu (2008) showed that high sensation-seekers were more likely than low sensation-seekers to deceive others online. Dickey (2014) also found that greater sensation seeking was related to higher self-reported deception in undergraduates. *Social desirability*, a habitual tendency to present oneself in a favorable way has also been related to lie-telling in adults, as people with greater impression management skills showed higher frequency of lies (Kashy and DePaulo, 1996. Gozna et al. (2001), however, found no relationship between lying and impression management for adults.

S*ocialization factors*, such as family, educational or cultural background*,* are among the most relevant external modulators of deception (Talwar & Crossman, 2011). *Teachers* socialize children to tell the truth (Popliger et al., 2011), yet children's deception does occur frequently in schools. We know little about the relationship between children' *attitudes toward school and teachers* and their lie acceptability, although indirect evidence shows children attending a more punitive school (with a strict disciplinary code) were more likely to lie and conceal a minor transgression than other children (Talwar & Lee, 2011).

Equally important are *relationships with peers*, as children's early lie-telling might decrease or increase during their socialization with peers (Talwar & Crossman, 2011). Lastly, children's *relationship with their parents* also plays a significant role in the development of deception. Even though parents accept that lying is sometimes appropriate, they teach children lying is morally wrong (Lavoie et al., 2016).

2.2.1.1. Current study

The main aim of the study was to 1) track the developmental trajectory of lie acceptability in children and adolescents. We were also interested in the way 2) gender and individual differences assessed with the BASC-2 (Reynolds & Kamphaus, 2004), specifically 3) anxiety, 4) sensation seeking, and 5) social desirability, relate to lie acceptability. Lastly, from a more exploratory standpoint, we 6) investigated children's attitudes toward school and teachers, peer relationships and relationship with parents in connection to children and adolescents' lie acceptability.

We aimed to examine how overall lie acceptability changes across development, expecting to reveal gradual increases in lie acceptability during this developmental window.

Our study also addresses mixed findings on *gender* differences in lie acceptability by exploring whether these potential differences vary across ages, from childhood to adolescence. We expected boys to display increased lie acceptability, but whether this tendency would be visible across the whole age range remains an exploratory question.

To our knowledge, our work is the first to study a direct link between *anxiety* and children's overall lie acceptability. We expected children and adolescents with lower anxiety to display higher lie acceptability. We also investigated for the first time the connection between adolescents' *sensation seeking* and their lie acceptability (this variable was assessed only for the children in middle school and the adolescents in high-school). We predicted that adolescents with higher sensation seeking would also be more accepting of deception. Our study is the first to relate children's and adolescents' *social desirability* to their lie acceptability. We predicted that higher social desirability would be linked to greater lie acceptability.

Finally, our study aimed to explore how children's and adolescents' *attitudes toward school and teachers* relate to their lie acceptability. We also examined children's *peer relationships and their relationship with parents*. We expected a connection between more positive relationships with peers and parents and lower levels of lie acceptability.

2.2.2. Method

2.2.2.1. Participants

The sample consisted of 821 Romanian children, with ages between 7 and 18 (mean age = 12.38 years, *SD* = 2.10). Age was coded according to 3 groups: children in primary school (7-10 years, middle childhood), middle school (10-14 years, early adolescence) or high-school (14-18 years, adolescence).

2.2.2.2. Instruments

We evaluated children's *lie acceptability* using the *Revised Lie Acceptability Scale* (Oliveira & Levine, 2008). To assess *anxiety, sensation seeking, social desirability, attitudes to school and teachers, peer relationships and relationship with parents*, we used the *BASC-2*, (Reynolds & Kamphaus, 2004).

2.2.3. Results

We performed a two-way ANOVA to test for age and gender differences in lie acceptability. There was an *effect of age on lie acceptability*, $F(2, 784) = 5.00$, $p = .007$, partial η^2 = .013, but no gender effect, $F(1, 784) = 3.80$, ns., or gender-age interaction, $F(2, 784) = .28$, ns. Bonferroni post-hocs showed that high-school children displayed higher levels of lie acceptability ($M = 27.26$; SD = 6.33) than primary school children ($M = 24.93$; $SD = 6.00$) and middle school children ($M = 25.51$; $SD = 5.91$). Since gender did not have an effect on lie acceptability it was excluded from the following analyses.

Using a multiple, hierarchical regression we predicted lie acceptability based on age group, anxiety, sensation seeking, social desirability, attitudes toward school and teachers, and relationships with parents and peers. Entered in step 1, *age* predicted lie acceptability $F(1, 405) =$ 6.88, $p < .01$, explaining a modest 1% of the variance in lie acceptability, adjusted $R^2 = .01$, $p <$ .01. At step 2 we introduced anxiety, sensation seeking, social desirability, attitudes toward school and teachers, and relationships with parents and peers; this model was also significant, $F(8, 398)$ $= 20.82$, $p < .001$, explaining an additional 27% of the variance in lie acceptability, $R^2 = .28$, $p <$ .001. In this second model age group remained a significant predictor, $\beta = -.09$, $p < .05$. Lower levels of anxiety, $\beta = .10$, $p < .05$, and lower sensation seeking, $\beta = .20$, $p < .001$, predicted lower lie acceptability. More positive attitudes toward school, $\beta = .27$, $p < .001$, more positive attitudes toward teachers, $\beta = .14$, $p < .01$, and better relationships with peers, $\beta = -.10$, $p < .05$, also predicted lower levels of lie acceptability. Social desirability, $\beta = .02$, ns, and relationship with parents, $\beta =$ -.04, ns, were not significant predictors.

2.2.4. Discussion

We identified age differences in lie acceptability, as high-school students showed greater lenience towards deceptive behavior compared to younger children. Lower anxiety and lower sensation seeking predicted children's and adolescents' decreased lie acceptability. For the first time, we showed that positive attitudes toward school and teachers predicted lower lie acceptability, as did better relationships with peers. Our hypotheses regarding gender, social desirability and relationship with parents were not confirmed.

Our study expanded previous work on lie acceptability (Goosie, 2014; Oliveira & Levine, 2008), showing that high-school children had increased lie acceptability compared to primary school and middle school children, supporting the idea that children become more lenient toward

deception as they grow older. Previous findings showed that older children believe lying is more acceptable compared to younger children (Lavoie et al., 2016), as children's attitudes toward deception change around the end of elementary school. Using the same lie acceptability questionnaire, Goosie (2014) found no age differences, yet this discrepancy could be due to the fact that our sample was much larger.

Across age groups, we found no evidence of *gender differences* for lie acceptability. Goosie (2014) revealed that boys were more lenient toward deception, yet their sample was not gender balanced, which might explain the conflicting results. In support of our findings, previous work using the same lie acceptability scale on adults (Oliveira & Levine, 2008) as well as other studies on children's moral evaluations of truth and lie-telling (Engarhos et al., 2019) showed no reliable gender differences regarding lie acceptability.

From an individual differences perspective, we showed that lower *anxiety* predicted lower lie acceptability. In study 1 we found a similar link between children's and adolescents' social anxiety and their self-reported likelihood of telling various types of lies (Buta et al., 2020), suggesting children with low anxiety might feel less fear and guilt and take more risks when lying, which would make them more prone to certain types of lies.

Lower levels of *sensation seeking* also predicted lower lie acceptability in the overall sample analysis. This might be due to the fact that low thrill seekers are more likely to follow rules and therefore more susceptible to socialization factors enforcing honesty. Young adolescents with high levels of sensation seeking are also more impulsive and have lower behavioral inhibition (Zuckerman, 2014; Perez-Fuentes et al., 2016), making them more prone to risk taking and deception.

Children and adolescents' *social desirability* was not related to lie acceptability. This result should be interpreted with caution, since other studies connected adults' impression management to their frequency or success of their lies (Kashy & DePaulo, 1996).

From an exploratory standpoint, we investigated children's *attitudes to school and teachers, their relationships with peers and relationship with parents* in connection to their attitudes toward deception. To our knowledge, this is the first study showing that more positive *views about school and teachers* predict decreased lie acceptability. Children who have good rapport with their school environment might be less inclined to deceive, either because they are socialized by the school environment not to tell lies (Popliger et al., 2011) or because they are less inclined to lie in order to avoid punishment in school (Talwar & Crossman, 2011).

Positive *relationships with peers* predicted lower lie acceptability. In line with Kashy and DePaulo (1996), our findings suggest that children who have more fulfilling relationships with others display less permissive views about lying. The reason behind this association might be due to children's other-regarding preferences, as Maggian and Villeval (2013) indicated that children who are more concerned with other's wellbeing are less inclined to lie.

Contrary to our hypothesis, children's *relationship with their parents* did not predict their lie acceptability. This apparently contradicts previous research on the importance of the relationship with parents in predicting less secrecy and more disclosure (Smetana et al., 2006). However, we only evaluated children's one-sided perception of this relationship, without an objective multi-method or multi-informant assessment.

2.2.4.1. Limitations

Our study has several limitations, the main one being that self-report measures might not be the best gateway into lie acceptability across the lifespan, and especially considering self-

monitoring difficulties specific to younger children. We also circumscribed the scope of the study to a unitary concept of lie acceptability and did not investigate children's attitudes toward various types of lies. Despite our efforts, our sample was not evenly distributed, including more children in middle school (N = 525) than primary school (N = 210) and high-school (N = 86), which could have affected our results regarding age differences. Moreover, we investigated a typical sample, with low levels of anxiety and sensation seeking, and results might be different if we had explored at-risk samples.

CHAPTER III. PERCEPTIONS OF EMOTIONAL (IN)AUTHENTICITY CUES AND EMOTION UNDERSTANDING

3.1 Study 3: Developing the Transylvania Emotional Expression Authenticity Inventory (TEXA-I)

3.1.1. Introduction

There has been recent interest in researching the authenticity of emotional expressions and the way people might detect this authenticity. Since this area of study is still emerging, there are a number of methodological concerns regarding the assessments used in the field. In order to evaluate perceptions of authenticity we need *reliable stimuli* that contain examples of authentic and inauthentic expressions, backed by people's actual emotional state, yet the existing stimuli have certain caveats. Therefore, the main aim of our study was to create a new inventory of pictures and videos of both authentic and inauthentic expressions, to be used for future research, named the Transylvania Emotional Expression Authenticity Inventory (TEXA-I).

Expressions differ based on the discrepancy between the felt emotion and the expressed one. As such, an expression can be *authentic* (the emotional state of the displayer matches their

outward expression), *suppressed* (the displayer is experiencing an emotion, but they are expressing a neutral state), *simulated* (the displayer is not experiencing a particular emotion, but they are outwardly expressing one) and *masked* (the displayer is experiencing an emotion, but they are outwardly displaying a different one). Several studies have shown that *adult individuals have a relatively low level of discriminating the (in)authenticity of emotional expressions*, with a rate only slightly above 50% (Hess & Kleck, 1994; Porter & ten Brinke, 2008). People may identify the authenticity for happy expressions, but have difficulties discriminating the veracity of emotional expressions of negative emotions (Dawel et al., 2015).

3.1.1.1. Existing assessment procedures or stimuli

The McLellan pictures (McLellan, Johnston, Dalrymple-Alford, & Porter, 2010) are, to our knowledge, the only emotional expression stimuli that assessed the actual emotion felt by the individuals displaying the photos. Due to the methods used to create and verify them, the identities of the displayers in these photos are not the same across different expression categories. Also the author recommends the use of a subset limited to 25 images, which have been more reliable than the rest of the set (T. McLellan, personal communication, May 11, 2016).

In their 2016 study, Dawel et al. created *ratings of perceived authenticity* for several stimuli from existing, widely used, facial expression databases, the McLellan et al. (2010) faces as well as relevant images from news media. Based on these stimuli they generated 2 new pictorial stimuli sets: one their participants perceived as genuine and another perceived as fake set.

As suggested by Dawel et al. (2016), there are several *key elements* of the stimuli meant to research emotional expression authenticity, which we have tried to cover while creating the new inventory. These refer to: 1) the source of the stimulus (are they simply posed or event-elicited); 2) the emotion the displayer in the stimulus is actually feeling (the displayer self-reported an

experienced emotion or not); 3) the presence of facial configuration hypothesized to underlie expression authenticity (for instance whether the Duchenne marker is visible or not); and 4) observers' perception of the stimuli (stimuli perceived as genuine vs. stimuli perceived as posed).

Another important aspect of the new inventory we developed refers to stimulus modality, as we created both picture and video stimuli and authentic/inauthentic emotional expressions. There is ample evidence to suggest that *emotional expressions portrayed in a dynamic manner in videos are better recognized by observes, compared to static stimuli* (Sato, Fujiumura, & Suzuki, 2008; Wehrle, Kaiser, Schmidt, & Scherer, 2000).

3.1.1.2. Current study

Our main aim was to create a new inventory of pictures and videos that display authentic and inauthentic emotional expressions, which would be ready to use in studies aiming to differentiate between several authentic and inauthentic emotional expressions. Consequently, there were two important study phases. In phase 1, we created the database containing both photo and video stimuli depicting individual displays of authentic and inauthentic (i.e., suppressed, masked, simulated) emotional expressions. We wanted to rely on an *emotion induction procedure* to ensure that the protagonists of the pictures and videos actually experience an emotion or a neutral state. We also used displayers' self-report to check if the targeted emotion was present.

In phase 2, independent raters evaluated the photo and video database in terms of expressed emotion (emotion identification) and authenticity (whether the expressed emotion was authentic or inauthentic). We expected: 1) the pictorial stimuli to exhibit lower recognition rates than that of the video stimuli as well as lower recognition rates compared to other pictorial stimuli of emotional expression from existing databases; 2) we also expected stimuli containing expressions of happiness to be more accurately labeled in terms of authenticity compared to

sadness and neutral expressions; and 3) we expected authentic stimuli to be more accurately recognized in terms of authenticity compared to inauthentic ones.

3.1.2. Method

3.1.2.1. Creating the picture and video stimuli

We recruited 29 young adults (18 women and 11 men, ages 20 to 37) to be displayers of the emotional expressions. Each displayer went through a one hour procedure, which started with an emotion elicitation phase in which they viewed an emotion inducing video. Afterwards, they had to imagine a personal situation that would elicit happiness, sadness or a neutral state (i.e., getting/losing an ideal job, having an ordinary day) and then self-report their emotional state. Based on their answers, we created nine personalized, imaginary scenarios, during which displayers had to express an emotion that could match how they felt (authentic) or could be incongruent with their feelings (masked, simulated or suppressed).

We obtained *4536 photos and 456 videos in total*. First we eliminated stimuli from the displayers who did not self-report the emotion we attempted to induce and stimuli with technical issues. Based on preliminary evaluations and a pilot study we selected a final set of stimuli to be included in the inventory and be rated for their perceived authenticity: *153 photos and 135 videos*.

3.1.2.2. Evaluating the stimuli

The sample consisted of *250 participants* (210 women); 102 of them completed both the assessment for the pictures and the videos. For the photo assessment observers viewed 153 photos (in a randomized order) and answered 3 questions: "What emotion does the person from the image express?" (choice between happiness, sadness or no particular emotion); "How real or false do you find the emotional expression of the person from the image?" (ranging from -3 for very false to 3

for very real); and lastly, if they answered -3, -2 or -1 to the second question they were asked "What emotion do you believe the person from the image is actually feeling?" (choice between happiness, sadness or no particular emotion). For the video assessment observers viewed 135 videos and answered the 2nd and 3rd questions detailed above.

3.1.3. Results

The average hit rate of the TEXA-I stimuli (percentage of times images were rated to reflect the target emotion) was 57.7% (SD = 8.05) for the videos and 29.4% (SD = 5.22) for the photos. Table 4 shows the hit rates corresponding to each expression category, for photos and videos.

Table 4. Descriptive statistics for the mean hit rates of the photos and videos

		Minimum	Maximum	Mean (%)	Standard deviation
Hit rates for the photo stimuli	Authentic happiness	48.15	84.34	**67.01**	8.43
	Inauthentic happiness (sadness)	8.98	47.34	34.30	11.02
	Inauthentic happiness (neutral)	2.44	53.57	32.01	14.67
	Authentic sadness	13.61	65.45	32.66	15.09
	Inauthentic sadness (happiness)	.00	36.31	16.59	11.91
	Inauthentic sadness (neutral)	2.42	43.79	14.46	12.39
	Authentic neutral	11.90	52.10	25.98	10.52
	Inauthentic neutral (happiness)	13.10	38.10	22.80	5.93
	Inauthentic neutral (sadness)	11.83	33.53	23.15	5.59
Hit rates for the video stimuli	Authentic happiness	62.00	96.00	**80.40**	10.33
	Inauthentic happiness (sadness)	18.00	89.00	**54.13**	22.30
	Inauthentic happiness (neutral)	13.00	93.00	**57.40**	25.85
	Authentic sadness	12.00	88.00	**53.07**	21.93
	Inauthentic sadness (happiness)	35.00	93.00	**65.40**	15.91
	Inauthentic sadness (neutral)	15.00	84.00	**53.07**	23.69
	Authentic neutral	24.00	74.00	**54.67**	13.23
	Inauthentic neutral (happiness)	21.00	66.00	46.53	11.84
	Inauthentic neutral (sadness)	35.00	87.00	**54.47**	16.08

Note. Bold means indicate hit rates above chance levels.

We also calculated the hit rates for the ratings of the real emotion behind the inauthentic emotional expressions. Results are shown in figures 1 and 2.

Figure 1. Hit rates for the identification of the real emotion behind inauthentic emotional expressions (photo stimuli)

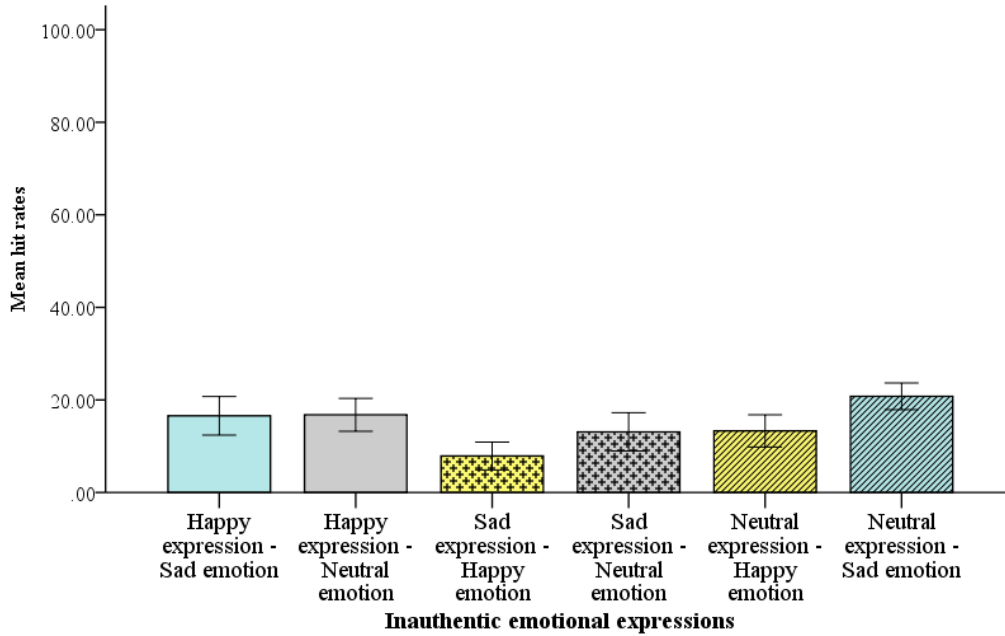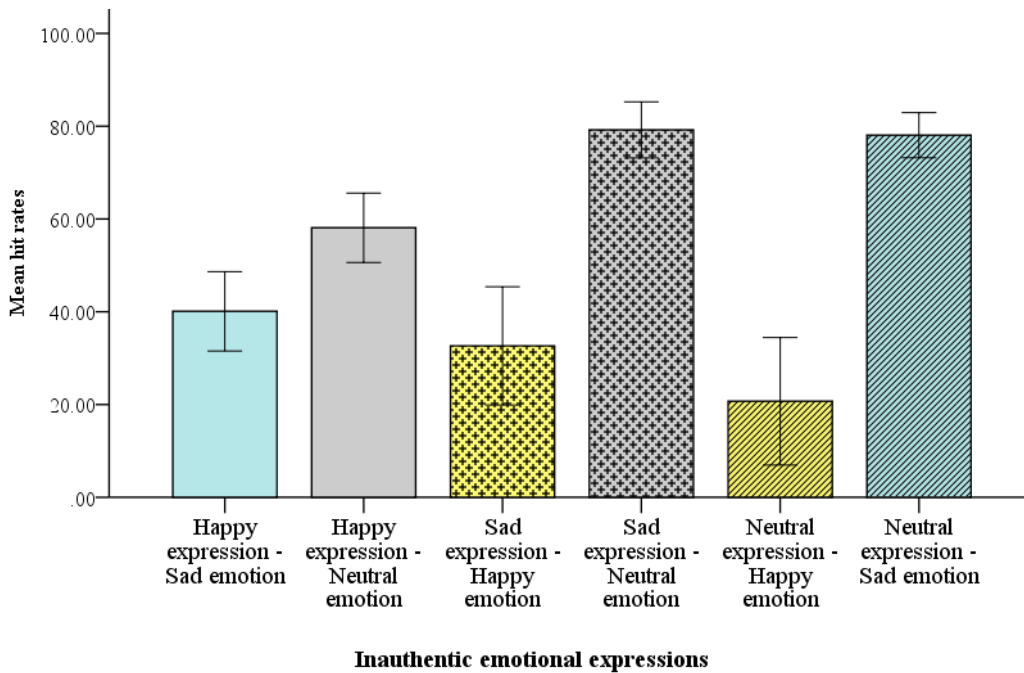*Figure 2.* Hit rates for the identification of real emotion behind inauthentic emotional expressions (video stimuli)

We performed a 2 x 3 x 2 repeated measures ANOVA of authenticity ratings with: 2 stimulus types (photos vs. videos), 3 emotions (happiness, sadness, neutral), and 2 types of authenticity (authentic vs. inauthentic). We found a main stimulus type effect, $F(1, 101) = 52.22$,

$p = .0001$, partial $\eta^2 = .34$, video stimuli being better perceived in terms of authenticity ($M = .59$; $SE = .01$) than the photo stimuli ($M = .53$; $SE = .01$). There was also a main effect of emotion $F(2, 100) = 180.02$, $p = .0001$, partial $\eta^2 = .64$. Happy expression had the highest recognition scores ($M = .69$; $SE = .01$), followed by sad expressions ($M = .53$; $SE = .01$) and neutral ones ($M = .50$; $SE = .01$). We uncovered a main effect of expression type, $F(1, 101) = 35.56$, $p = .0001$, partial $\eta^2 = .26$, as authentic expressions ($M = .61$; $SE = .01$) were better recognized than inauthentic ones ($M = .50$; $SE = .01$). Results also show significant interaction effects, a stimulus type * authenticity effect, $F(1, 101) = 30.8$, $p = .0001$, partial $\eta^2 = .23$, an emotion * authenticity type interaction, $F(2, 100) = 61.15$, $p = .0001$, partial $\eta^2 = .38$, and a stimulus type * emotion * authenticity type interaction effect, $F(2, 100) = 18.24$, $p = .0001$, partial $\eta^2 = .15$. To better pinpoint these interaction effects we performed paired sample t tests, testing pairs of emotional expression ratings. For a detailed description of means, standard deviations and t values see Tables 5, 6 and 7.

Table 5. Differences between emotional expression authenticity recognition levels for photos and videos

Variable		Photos		Videos			
	N	M	SD	M	SD	t	p
Authentic happiness	102	**.81**	.19	**.74**	.16	**3.49**	**.001**
Inauthentic happiness	102	**.43**	.18	**.59**	.17	**-8.85**	**.001**
Authentic sadness	102	.56	.16	.52	.20	1.42	.159
Inauthentic sadness	102	**.45**	.16	**.60**	.13	**-8.91**	**.001**
Authentic neutral	102	**.50**	.17	**.56**	.20	**-2.45**	**.016**
Inauthentic neutral	102	**.43**	.15	**.51**	.15	**-3.69**	**.001**

Note. Bold results indicate significant differences.

Table 6. Differences between emotional expression authenticity recognition levels for authentic and inauthentic expressions

Variable		Authentic		Inauthentic			
	N	M	SD	M	SD	t	p
Happiness (photos)	102	**.82**	.19	**.44**	.18	**15.49**	**.001**
Sadness (photos)	102	**.57**	.17	**.44**	.16	**6.18**	**.001**
Neutral (photos)	102	**.49**	.17	**.42**	.15	**3.29**	**.001**
Happiness (videos)	102	**.75**	.15	**.57**	.17	**9.25**	**.001**
Sadness (videos)	102	**.53**	.19	**.60**	.14	**-3.18**	**.002**
Neutral (videos)	102	.53	.23	.51	.16	1.11	.269

Note. Bold results indicate significant differences.

Table 7. Differences between emotional expression authenticity recognition levels for happiness, sadness and neutral emotions

	N	Happiness		Sadness		t	p	Happiness		Sadness		t	p	Sadness		Neutral		t	p
		M	SD	M	SD			M	SD	M	SD			M	SD	M	SD		
Authentic (photos)	102	**.82**	.19	**.57**	.17	**14.42**	**.001**	**.82**	.19	**.49**	.17	**16.83**	**.001**	**.57**	.17	**.49**	.17	**6.22**	**.001**
Inauthentic (photos)	102	.44	.18	.44	.16	.26	.797	.44	.18	.42	.15	1.41	.160	.44	.16	.42	.15	1.48	.141
Authentic (videos)	102	**.75**	.15	**.53**	.19	**16.47**	**.001**	**.75**	.15	**.53**	.23	**13.12**	**.001**	.53	.19	.53	.23	-.41	.679
Inauthentic (videos)	102	.57	.17	.60	.14	-1.77	.078	**.57**	.17	**.51**	.16	**5.06**	**.001**	**.60**	.14	**.51**	.16	**7.02**	**.001**

Note. Bold results indicate significant differences.

3.1.4. Discussion

The main goal of this study was to create a new inventory of pictures and videos that display authentic and inauthentic emotional expressions, the Transylvania Emotional Expression Authenticity Inventory (TEXA-I). The inventory contains *153 pictures* as well as *135 short videos*. These can be employed for future studies, using perceived ratings of authenticity as a way to select which ones are appropriate according to research questions. This inventory is the second one (the first being the McLellan faces; McLellan et al., 2010) to be specifically designed to contain authentic and inauthentic expressions of emotions and the only one, to our knowledge, to contain video stimuli of such expression.

As noted by Dawel et al. (2016) the field of research on emotional expression authenticity lacked a comprehensive set of stimuli. The McLellan faces (McLellan et al., 2010) did not have complete sets of emotional expressions, whereas the perceived as genuine/posed sets of images obtained by Dawel et al. mostly did not contain stimuli backed by elicited emotions and displayer self-report. Also, both of these sources only included static, pictorial stimuli. Therefore, our inventory is a valuable and necessary addition of static and dynamic stimuli created to contain all types of authentic and inauthentic expressions for happiness, sadness and neutral emotional state, accompanied by ratings of their perceived authenticity.

Compared to stimuli from other databases of happiness, sadness or neutral expressions (Kim et al., 2017; Meuwissen et al., 2017, Van der Schalk et al., 2011) the hit rates obtained in our study were much lower, given the fact that the task was more demanding. While videos fared much better than pictures, the hit rates as still comparably lower than those of other stimuli. This is consistent with existing findings showing people generally have difficulties identifying the

authenticity of emotional expressions (Hess & Kleck, 1994; Porter & ten Brinke, 2008). If we interpret this from a deceptive standpoint, considering inauthentic expressions as deceptive emotional expression, our results (mostly for the video stimuli) are similar to that obtained in deception detection literature (Levine, 2015).

Our results showed that *observers' showed better authenticity recognition rates for videos compared to photos*, confirming existing findings on the superiority of dynamic video stimuli (Sato et al., 2008; Van Der Schalk et al., 2011; Wehrle et al., 2000). This might be due to the fact that videos contain multiple sources of relevant information, as observers can see an emotion dynamically unfolding from start to finish, they see facial movements and perhaps upper body gestures as well as vocal cues which might be relevant to emotion recognition (ten Brinke, MacDonald, Porter, & O'Connor, 2012). We also found an emotion effect as *happiness was better recognized than sadness and neutral expression and sadness was also better identified than neutral expressions*. This is line with previous work regarding emotion recognition as well the results obtained in previous databases of emotion recognition stimuli (Kim et al., 2017; Meuwissen et al., 2017; Van Der Schalk et al., 2011; Tottenham et al., 2009).

O*verall authentic expressions were more accurately labeled in terms of authenticity compared to inauthentic ones*. Looking into the interaction effects we noticed that, *across emotions, authentic expressions had higher recognition rates compared to inauthentic ones*. This suggests that genuine emotional display might be more intense (Porter & ten Brinke, 2008) and therefore easier to spot. There was a *notable exception for video stimuli, in which inauthentic sadness was better recognized than authentic sadness*. Since we used a natural context and non-actor displayers, the genuine sadness showcased by our displayers might not fit the stereotypical expressions observers expected. There is great variability in the way people convey sadness on

their face which might not look anything like the frowned face we expect or are taught to look out for (Barrett, 2018) and our results might simply reflect that.

As an innovative element, we also investigated if observers can identify the *real emotion behind inauthentic expression*. Observers could not identify the real emotion if they were presented with photos. However, they *could identify the real emotion showed in videos for certain types of expressions*: simulated expression of happiness and sadness and suppressed. This might suggest that, when presented with enough dynamic information from videos, such as an expression unfolding in motion, verbal cues, and other movements of the head or shoulders observers might have the ability to recognize how a displayer is actually feeling.

3.1.4.1. Limitations

Our research has certain important *limitations*, such as the fact that the inventory only includes white, Caucasian models with similar age and educational background. The inventory also contains stimuli for happiness, sadness and neutral expressions without including expressions for other negative emotions such as fear or anger. When creating the stimuli we did not control for the displayers' position of for their eye gaze direction because we wanted to prioritize displayers comfort and ensure they convey the emotional expression in the direction and posture they would use in their daily lives. Similarly, although we controlled for the induced states of the expression displayers, we cannot be certain that our emotion elicitation procedure was 100% successful and that the displayers actually felt the emotion they self-reported. Given this was still a laboratory setting it is possible they simply reported their emotional state from a wish to complete the scenario or answer in a socially desirable way.

3.2. Study 4: Preschoolers' perception of authentic and inauthentic emotional expressions. Connections with their social competences

3.2.1. Introduction

Extensive research has been performed on the way children understand and recognize other people's emotions, as this ability is an essential part of human relationships. However, we know less about children's ability to determine the authenticity of emotional expressions.

Existing findings have shown that school-aged children can distinguish between real and false smiles, yet their accuracy is poorer compared to adults (Del Giudice and Colle, 2007; Gosselin, Beaupre, & Boissonneault, 2002). More recently, Song, Over and Carpenter (2016) found that the ability to *differentiate between real and false smiles* emerges at the age of 3, but is more evident for 4-year-olds.

While children seem to be relatively able to recognize the authenticity of smiles, their performance regarding *expressions for negative emotions* is less accurate. Dawel, Palermo, O'Kearney and McKone (2015) showed that children (8-12-year-olds) can identify the authenticity of smiles, but their performance was still poorer compared to adults. In the case of negative emotions, fear and sadness, children could not accurately differentiate between authentic and inauthentic expressions. Adults could discriminate the authenticity of sad expressions, but not fearful ones. Dawel et al. (2015) suggested that recognizing the authenticity of sad and fearful expressions is a difficult task that requires complex processing of facial cues as well as possible reliance on personal experience with deceptive emotional expressions. These skills most likely mature at later developmental stages. Serrat et al. (2020) also investigated the discrimination between authentic and inauthentic expressions for negative emotions, in a sample of children of ages 3 to 8. *Findings revealed that the ability to recognize the authenticity of negative emotional*

expressions gradually develops between the ages of 4 and 6, but becomes more well-established

from the age of 6 and above.

While plenty of evidence shows social competences are linked with emotion understanding (Trentacosta & Fine, 2020), less is known about the relationships between children's specific ability to recognize the authenticity of emotional expressions and their social skills. Pons and Harris (2019) suggest that children with good understanding of hidden emotions are more popular and better able to resolve interpersonal conflicts, indicating a plausible connection between recognition of emotional expression authenticity and social competences.

3.2.1.1. Current study

The primary aim of our study was to investigate preschoolers' ability to identify the authenticity of happiness and sadness expressions in a sample of children aged 3 to 6 years old, split into two distinct educational groups. To our knowledge, this is the first study to investigate both positive and negative emotional expressions in children younger than eight.

Based on the results of Dawel et al. (2015), we expected an emotion effect, with expressions of happiness being better recognized than those for sadness. Given the fact that authentic expressions are usually more intense in their configuration (Dawel et al., 2016; Porter & Brinke, 2008), it is plausible to find an effect for authenticity type, with authentic expressions being better identified. We expected age differences regarding recognition ability, mainly for older preschoolers to have a better performance in recognizing emotional expression authenticity.

Another aim of the study was to explore the possible connection between children's ability to recognize the authenticity of emotional expressions and their social competences, specifically their interpersonal skills and prosocial behavior.

3.2.2. Method

3.2.2.1. Participants

A total of 74 children participated in the study, with ages between 3 and 6 (*mean age =* 4.51, *SD* = 1.01, 43 girls); 33 of them were enrolled in the youngest preschool group (3 and 4-year-olds) and 41 were enrolled in the oldest preschool group (5 and 6-year-olds).

3.2.2.2. Measures

We controlled for children's ability to recognize and label 4 *basic emotional expressions*: happiness, sadness, anger and fear. For this purpose we built a task containing 16 images from the Radboud Face Database (Langner et al., 2010), 4 different items for each emotions.

To assess *recognition of emotional expression authenticity* we used pictorial stimuli from the inventory described in Study 3, pertaining to 2 emotions: happiness and sadness and 2 types of authenticity: authentic and inauthentic expressions. The task included an introduction phase in which the examiner talked about authentic and inauthentic expressions using a short story with examples of children that express their emotions or hide them. Children were presented with 16 images from TEXA-I and their answers were recorded by the examiner. Children were asked to decide if the boy/girl in the picture was really feeling happy/sad or if he/she was only pretending to be happy/sad. Children could answer by pointing on a board with two emojis. Scores for each types of emotional expression ranged from 0 (if they did not identify any of the 4 expressions) to 100% (if they identified all 4 expressions correctly).

Additionally, we measured children's *interpersonal skills and prosocial behavior* with two subscales from the Social Competencies Screening from the PEDa softwarev (Ștefan, et al., 2009).

3.2.3. Results

In order to test for the effects of emotion type, authenticity type and age group on the *recognition of the authenticity of emotional expressions* we performed a 2 x 2 x 2 mixed ANOVA with emotion (happiness vs. sadness) and authenticity (authentic vs inauthentic) as within factors and age group (younger vs. older preschoolers) as a between group factor. The results indicated a main effect of emotion type, $F(1, 72) = 32.45$, $p = .0001$, partial $\eta^2 = .31$, as children had higher recognition scores for overall happiness ($M = 77.26$; $SE = 1.79$) compared to overall sadness ($M = 60.43$; $SE = 2.21$). There was also a main effect for authenticity type, $F(1, 72) = 8.28$, $p = .005$, partial $\eta^2 = .010$, as children had higher recognition scores for authentic expressions ($M = 74.49$; $SE = 2.34$) compared to inauthentic ones ($M = 63.20$; $SE = 2.44$). There was also an interaction effect between emotion type and authenticity type, $F(1, 72) = 20.64$, $p = .0001$, partial $\eta^2 = .022$. Post-hoc analyses were done by performing paired sampled t tests. Children had the highest recognition for authentic happiness expressions ($M = 88.85$; $SD = 19.91$) compared to inauthentic happiness ($M = 88.85$; $SD = 19.91$), $t(73) = 5.82$, $p = .0001$, authentic sadness ($M = 58.78$; $SD = 31.9$), $t(73) = 7.81$, $p = .0001$, and inauthentic sadness ($M = 60.81$; $SD = 29.28$), $t(73) = 6.83$, $p = .0001$. No other interactions were found.

Furthermore, we did uncover a significant age group effect, $F(1, 72) = 21.62$, $p = .0001$, partial $\eta^2 = .023$. Younger preschoolers (3 & 4-year-olds) had an overall higher recognition for these expressions ($M = 75.19$; $SE = 2.03$) than older preschoolers (5 & 6-year-olds) ($M = 65.20$; $SE = 1.82$). The results are also reflected in Table 8.

Table 8. Percentage of children who performed above chance levels (75% or above) in recognizing the authenticity of emotional expressions

	Authentic happiness	Inauthentic happiness	Authentic sadness	Inauthentic sadness
3 – 4-year-olds (N = 33)	100%	63.6%	57.6%	69.7%
5 – 6-year-olds (N = 41)	78%	46.3%	43.9%	41.5.%
All pre-schoolers (N=74)	87.8%	54.1%	50%	54.1%

Pearson correlations controlling for age revealed an association between children's recognition of inauthentic happiness and their prosocial behavior, $r = .31$, $p = .008$, as children with lower levels of prosocial behavior also showed poorer recognition of inauthentic happiness.

3.2.4. Discussion

Our research revealed that most preschoolers could identify authentic happiness well above chance levels, having low to moderate performances identifying inauthentic happiness and sadness as well as authentic sadness. We also found an unexpected age effect as younger children appeared to have better overall recognition of the authenticity of emotional expression than older children. Lastly, we also uncovered a connection between preschoolers' ability to identify inauthentic happiness and their prosocial behavior.

The *majority of children performed at above chance levels at identifying the authenticity of emotional expressions for authentic happiness* (87%). About half of the children could identify the authenticity behind expressions of authentic sadness (50%) and inauthentic happiness (54.1%) and sadness (54.1%). This is similar to previous findings by Serrat et al. (2020) showing that *the ability to recognize the authenticity of negative emotional expressions is present for some children between the ages 4 and 6, but only becomes well established after the age of six.*

Our findings suggest that children *were better at identifying the authenticity behind expressions of happiness, smiles, than expressions of sadness*. Perhaps recognizing the authenticity

of sad expressions is a difficult task that most likely is mastered at later developmental stages (Dawel et al., 2015). Children had *higher rates of recognition for overall authentic expressions than overall inauthentic ones.* There is evidence showing that children, even preschoolers, rely on the intensity of the expression when judging authenticity (Dawel et al., 2015; Del Giudice and Colle, 2007; Thibault et al., 2009). Additionally, authentic expressions are usually more intense in their configuration (Dawel et al., 2016; Porter & Brinke, 2008), suggesting children might have used the increased intensity of the authentic expressions as a cue to label them correctly.

Our data also indicated that children had a *higher level of recognition for authentic smiles compared to all other types of expressions*, which supports Song et al.'s (2016) results that preschoolers can differentiate between real and false smiles. This result might plausibly be explained by the use of intensity as a cue, since authentic smiles do seem to be quite intense in their facial configuration.

Regarding *age effects*, our data surprisingly showed that the 3 - 4-year-olds had a better performance in recognizing emotional expression authenticity. We interpret this result as most likely an artifact of this particular sample. It is possible the examiner might have inadvertently *emphasized the instructions regarding emotional expression authenticity* more for younger children. Lastly, it is alsi plausible that older preschoolers' lower performance was due to them being more *suspicious of the emotional expressions they judged*, since older children better understand that emotions can be hidden (Banerjee, 1997; Pons et al., 2004) but not necessarily sufficient personal experience in applying this social knowledge (Kromm et al., 2014).

For the first time, we found that *children with lower levels of prosocial behavior also showed poorer recognition of inauthentic happiness*. Given the documented bias towards assigning a genuine label to emotional expression stimuli (Dawel et al., 2016) it is possible that

children with low prosocial behavior relied on this tendency to label inauthentic smiles as being truthful. Perhaps these children did not benefit from enough *relevant social interactions* in order to discriminate the authenticity of smiles.

3.2.4.1. Limitations

In order to minimize task demands and keep assessment time as short as possible we did not include any measures regarding children's executive functioning or their linguistic abilities. For similar task demand reasons we limited the number of image stimuli to 4 per each emotional expression, whereas a larger number of examples would have enabled us to create a more detailed assessment. Additionally, we chose to use photo stimuli from the TEXA-I despite the recognition superiority of videos shown in study 3, mainly to reduce assessment time and to minimize potential distractor effects videos might have had on children's focus.

3.3. Study 5: Emotion understanding and anxiety symptoms in primary school-age children[3]

3.3.1. Introduction

In recent years, there has been particular interest in the relationship between anxiety and emotional competence. For an individual to successfully modulate an emotional state, they also require *knowledge about the emergence and management of emotions*, with studies suggesting a bidirectional relationship between the two (Izard et al., 2008). This is precisely why it becomes plausible that deficits in emotion understanding might be a factor in the development of anxiety symptoms.

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[3] This study has been published as a book chapter: Buta, M., Ciornei, O, Fizeşan, C., Jurje, O., & Visu-Petra, L. (2015). Anxiety symptoms in primary school-age children: Relation with emotion understanding competences. In Moore, K., Buchwald, P., & Howard, S. (Eds) *Stress and Anxiety. Applications to Schools, Well-Being, Coping, and Internet Use.* Berlin: Logos Verlag

In a recent meta-analysis regarding *emotion knowledge and social anxiety*, O'Toole, Hougaard, and Mennin (2013) found that both intrapersonal and interpersonal knowledge about emotions were related to social phobia. While reduced emotional knowledge may be a vulnerability factor in the development of anxiety it is also possible that deficits in emotion comprehension appear as a response to social anxiety problems; so-called "secondary alexithymia" (Taylor, Bagby, & Parker, 1997).

To our knowledge, there is only one study examining the association between emotion understanding and anxiety in children; Southam-Gerow and Kendall (2000) compared children (ages 7.5 to 14) referred for clinical anxiety with a group of typical children (8 to 15) and found that *children with anxiety disorders had lower comprehension of hiding and changing their emotions, with both being related to the modulation of affect*. However, anxious and non-anxious children had similar results concerning the detection of emotional cues and knowledge of multiple emotions. Therefore, children referred for anxiety treatment showed specific deficits in the understanding and regulation of emotions, reporting fewer and less mature ways of possibly changing their emotions. These results, along with other research on psychopathology and emotion understanding (Celani, Battachi, & Arcidiacono, 1999; Hadwin, Baron-Cohen, Howlin, & Hill, 1996) support the need of addressing emotional knowledge in clinical interventions and call for additional developmental research to further clarify this association.

3.3.1.1. Current Study

The present study aimed to investigate the relationship between individual differences in anxiety and emotion understanding, focusing on a sample of typically developing primary school-aged children (ages 7 to 9).

Firstly, previous research on emotion comprehension and anxiety (Southam-Gerow & Kendall, 2000) compared clinically referred youth for anxiety to non-anxious children. We were interested in the broader developmental aspects of these constructs and therefore expanded this line of study by looking into individual differences in anxiety and emotion understanding in a normative sample of school-age children. Also, current literature suggests that children's emotion understanding abilities begin to solidify at around age 11 (Pons & Harris, 2005; Harris, 2008) and are established in adolescence (O'Toole et al., 2013), which is why we were interested in looking at a younger sample of children (ages 7 to 9) to see how such individual differences in emotional competence emerge.

Therefore, based on the limited existing literature (Southam-Gerow & Kendall, 2000), we hypothesized that children who did not acquire understanding of certain emotional components would also have higher anxiety levels than those who mastered these abilities. We also expected broader aspects of emotion understanding to be associated with specific anxiety symptoms, particularly social anxiety and panic.

3.3.2. Method

3.3.2.1. Participants

156 Romanian school-aged children aged between 7 and 9 years (mean age = 98.65 months; *SD* = 6.16; 82 girls) were involved in this study. The children came from two different schools, being enrolled in either first or second grade, with all residing in an urban setting.

3.3.2.2. Measures

Parents completed the parent version of the *Revised Children's Anxiety and Depression Scale* (Chorpita et al., 2000). In order to measure children's levels of emotion understanding we

used the *Test of Emotion Comprehension* (TEC). The test includes 9 separate components that evaluate how well children comprehend emotions of increasing complexity: 1) Simple emotion recognition; 2) Understanding external causes of emotion; 3) Understanding desire-based emotions; 4) Understanding belief-based emotions; 5) Understanding the influence of a reminder; 6) Understanding the regulation of an experienced emotion; 7) Understanding the possibility of hiding an emotion; 8) Understanding mixed emotions; 9) Understanding moral emotions (Pons & Harris, 2000). Each of these can be organized hierarchically into group components: the external, mental component and reflective components (Pons & Harris, 2005).

3.3.3. Results

We first performed a one way analysis of variance (ANOVA) to test for differences in anxiety between children who did or did not acquire each of the nine emotion comprehension components. Children that did not master understanding of the fact that emotions can be hidden showed higher obsessive-compulsive disorder levels ($M = 2.45$, $SD = 2.50$) than children who acquired comprehension of hidden emotions ($M = 1.55$, $SD = 1.76$), $F(1, 154) = 6.92$, $p = .009$. There were no other significant differences. Bivariate correlations between measures of anxiety and of emotion comprehension showed that, even after controlling for age, higher levels of obsessive-compulsive symptoms were negatively associated with understanding external aspects of emotion ($r = -.18$, $p < .05$), comprehending mental aspects of emotion ($r = -.21$, $p < .05$) and overall emotion understanding ($r = -.25$, $p < .01$).

3.3.4. Discussion

The main findings of our study revealed a link between emotion understanding and obsessive-compulsive symptoms, specifically, children who had not acquired understanding of the fact that emotions can be hidden also showed significantly higher levels of obsessive-compulsive

disorder. Moreover, a less developed understanding of external and mental aspects of emotions, as well as poorer overall comprehension of affective processes were associated with higher obsessive-compulsive symptoms.

Our findings are consistent with previous work linking alexithymia and OCD in adults (Bankier, Aigner, & Bach, 2001; Rufer et al., 2006). Individuals with OCD symptoms have difficulties articulating their affective experiences and clarifying their emotions (Smith, Wetterneck, Hart, Short, & Björgvinsson, 2012). These studies suggest that *processing of affective states and emotion knowledge play an important part in the manifestation of the disorder*. Furthermore, OCD symptoms have been associated with abnormal functioning of the orbitofrontal cortex (Evans, Lewis, & Iobst, 2004). Since the orbitofrontal cortex is involved in the registration and regulation of affect, specifically in representing relevant stimuli and emotional states (Evans et al., 2004), it becomes plausible that OCD symptoms would be linked to poorer emotion understanding, even among children.

Our preliminary results underline the need to more thoroughly investigate and address emotion comprehension skills in children with elevated obsessive compulsive symptoms, which might constitute a vulnerability factor for the development of this disorder. Conversely, OCD symptoms could themselves constitute precursors of impaired emotion understanding and management abilities, leading to the documented interpersonal and intrapersonal emotional deficits characterizing this condition, underlining the need for early intervention programs.

CHAPTER IV. CONCLUSIONS

4.1. Main thesis findings

Our work significantly extends current knowledge regarding the way people view deception and perceive the authenticity of emotional cues. Attitudes towards deception change and become more flexible as children develop, being dependent on the types of lies and their interpersonal consequences. Both children and adults' perception of emotional expression authenticity is a highly nuanced ability that is shaped by the nature of the emotional cues presented. From a social information processing perspective, we viewed the two main concepts of the thesis as part of the steps referring to the encoding and interpretation of cues (Lemerise and Arsenio, 2000). We linked perceptions of deception and emotion processes such as social desirability and anxiety and also related attitudes to a specific form of behavioral enactment, deceptive behavior. Lie acceptability was also related to other interpretations of social cues, such as attitudes towards school and teachers, as well as quality of peer relationships. Emotion understanding was also significantly connected to anxiety, while the recognition of authenticity cues was related to prosocial behavior, a component related to the behavioral enactment of positive social goals.

Our results showed that lie acceptability increases with age and suggested that people's views about deception potentially influence their perceived behavior, regardless of age, as individuals who were more accepting of certain lies were also more prone to lie-telling. Specifically, attitudes toward white lies and self-reported likelihood of prosocial lies were the most relevant predictors involved in self-reported lie-telling, showing that two different aspects of deception, harmless as well as more socially oriented lies, could both account for behavior differently. Children with decreased anxiety were less accepting of lying overall, and less likely to tell prosocial lies, implying that anxiety might be a key factor in children's development of

deception. Individual differences in social desirability were also relevant; although they might resort to lie-telling, socially desirable children have a potential propensity to under-report their behavior in order to manage their social image and impression. Our findings also indicated that educational and interpersonal contexts are equally relevant, as children's positive views of school and their satisfaction with interpersonal relationships predicted reduced lie acceptability.

We also bridged several important lines of research by showing that both children and adults showed a relatively good performance in identifying authentic happiness and had low to moderate performances identifying inauthentic happiness and sadness as well as authentic sadness. The ability to detect authenticity is also nuanced according to the type of emotion and expression, since both children and adults better identified happy expressions compared to sad ones, and authentic expressions compared to inauthentic ones. Furthermore, our results underlie the importance of complex emotional cues, since adults had a *better performance in correctly labeling video stimuli,* which contain more relevant information and depict verbal cues and the dynamic ways in which expressions unfold. We also showed that, when provided with more emotional cues from video stimuli, adults can *identify the real emotion hidden behind certain inauthentic expressions*, specifically simulated expressions of happiness and sadness and suppressed sadness. We also uncovered some previously undocumented connections between preschoolers' ability to identify inauthentic happiness and their *prosocial behavior* as well as a link between primary-school children's *understanding of emotions* can be hidden and their *anxiety*, specifically referring to obsessive-compulsive symptoms.

Next, Table 9 shows a summary of the main findings from the 5 studies of the thesis.

Table 9. Summary of main thesis findings

Study	Main concepts	Sample	Main findings

Study 1	• Attitudes toward deception
	    o Attitudes toward lies (white lies and degrees of lying)
	    o Likelihood of approaching prosocial and self-interested lies
	    o Likelihood of avoiding certain lies (risk of discovery or breaking a promise)
	• Self-reported frequency of deception
	• Anxiety
	• Social desirability
		N = 177
		• Primary school children
		• Middle school children
		• High-school children
		• Young adults
			• Younger children had more negative attitudes toward white lies and a decreased likelihood of telling self-interested lies than older children and adults.
			• Middle school children showed less *aversion to lies with a risk of discovery* than primary school children, or adults. They also had a lower *aversion to breaking a promise* than adults.
			• Primary-school children and adults displayed a lower self-reported lying frequency than middle-school children and high-schoolers.
			• For children and adolescents, more lenient attitudes toward white lies predicted higher self-reported lie-telling, independent of age effects. For adults, a greater likelihood of telling prosocial lies predicted higher self-reported lying frequency.
			• Gender differences: middle school girls were more likely to tell lies despite the risk of discovery, and young adult women were more permissive of white lies.
			• Low anxiety was associated with a lower likelihood of telling prosocial lies and a lower likelihood of avoiding risking discovery.
			• Reduced social desirability predicted a higher self-reported lying frequency.

Study 2	• Lie acceptability • Anxiety • Sensation seeking, • Social desirability • Attitudes toward school • Attitudes toward teachers • Peer relationships • Relationship with parents	N = 821 • Primary school children • Middle school children • High-school children	• High-school students showed greater lie acceptability compared to younger children. • Lower anxiety and lower sensation seeking predicted middle school children's decreased lie acceptability. • Positive attitudes toward school and teachers predicted lower lie acceptability for primary and middle school children, but they were not significant predictors for high school children. • For middle school children better relationships with peers predicted lower lie acceptability.

Study 3	• Creating a new inventory of authentic and inauthentic emotional expressions o Recognition of emotional expression authenticity	N = 250 • Adults	• The photo stimuli showed an average hit rate of 29%, whereas videos showed an average hit rate of 57%. • Observers' showed better authenticity recognition rates for videos compared to photos. Happiness was better recognized than sadness and neutral expression; sadness was also better identified than neutral expressions. Overall authentic expressions were more accurately labeled in terms of authenticity compared to inauthentic ones. • Observers could identify the real emotion behind inauthentic expressions showed in videos for some types of expressions: simulated happiness and sadness and suppressed sadness.

Study 4	• Recognitions of basic emotional expressions
	• Recognitions of emotional expression authenticity
	• Social competences
	  o Prosocial behavior
	  o Interpersonal relationships
		N = 74
		• Preschoolers
			• Most preschoolers could identify authentic happiness well above chance levels, having low to moderate performances identifying inauthentic happiness and sadness as well as authentic sadness.
			• Younger children, ages 3 to 4, appeared to have better overall recognition of the authenticity of emotional expression than older children, ages 5 to 6.
			• Preschoolers' ability to identify inauthentic happiness was connected to their prosocial behavior

Study 5	• Emotion understanding o Understanding hidden emotions • Anxiety	N = 156 • Primary-school children	• Emotion understanding was associated with obsessive-compulsive symptoms, • Children who had not acquired understanding of the fact that emotions can be hidden also showed significantly higher levels of obsessive-compulsive disorder.

4.2. Limitations

Our studies on perceptions of deception have several important limitations, as *self-report measures* might not be the best gateway to assessing people's implicit attitudes and actual lie telling behavior. It is also possible that the younger children in our studies had trouble *reporting their own deceptive behavior* and *beliefs*. Additionally, from a desire to evaluate all participants in an age-appropriate manner we used *different measures of social desirability* for the children and adults and in different studies. Therefore, further research should focus on using a consistent methodology that allows for age comparisons.

While it would have been invaluable to *directly compare children and adults' ability to identify the authenticity of emotional expression*, we were faced with a methodological limitation. In study 3 adults' ability was assessed using a high number of stimuli, for most participants the full set of the TEXA-I which led to relatively high task demands, while in Study 4 children were assessed using only a small, age-appropriate, number of stimuli. Furthermore, for the fourth study we selected pictures with higher hit rates (provided in Study 3), shown to be have a better detection rate, therefore the two assessments are not directly comparable. A fair comparison would entail evaluating adults with a less demanding task that also involves stimuli from TEXA-I selected to have relatively high recognition rates for authenticity.

While providing valuable information on people's ability to detect the authenticity of emotional expressions, our studies (Studies 3, 4 and 5) cover only *limited age ranges* across development, mainly preschool and primary-school age and adulthood, and do not provide information regarding preadolescents and adolescents. Conceptually, Study 4 and Study 5 looked at different facets of perceptions of authenticity for emotional cues, which means the results are not directly comparable.

4.3. Practical implications

In terms of ***attitudes towards deception and lie acceptability***, our results offer possible insights for educational and parental practices. Programs and interventions designed to promote honesty should take into account the fact that lie acceptability and the context of deception might be involved in a person's lie telling behavior and include specific components that target attitudes towards deception. Interventions can also focus on the important distinction between prosocial and antisocial lies, covering content related to the consequences of different types of deception for self and others.

Furthermore, educational practices should take into account the fact that attitudes towards school and teachers predicted lie acceptability. Children with good rapport with their school environment might be less inclined to deceive, which suggests that *harsh school discipline or severe punishments for transgressions* would have a negative impact on children's honesty. Instead, especially for younger children, schools and teachers could foster *qualitative relationships with students* which, in turn, might be connected to less permissive views about deception.

Relating to the ***perception of emotional (in)authenticity cues and emotion understanding***, the most important practical outcome is the new inventory, the Transylvania Emotional Expression Authenticity Inventory (TEXA-I) The *stimuli can be very useful for future research on people's ability to recognize emotional expressions*, as the authentic stimuli contain ecologically valid examples of expressions obtained in an event-elicited, naturalistic way. The inventory can also be employed in *specific research related to children and adults' understanding and recognition of emotional expression authenticity*. We specifically recommend that future studies clearly focus on using video stimuli rather than photos, especially when the study design and practical conditions allow it.

Programs aimed at *improving socio-emotional competences* could include content about the authenticity of emotional expressions. By understanding the fact that emotional expressions have complex socio-emotional meanings behind them, children could learn to use various cues, including expression veracity to make *social decisions appropriate to their goals and context*. This might also be helpful in terms of ameliorating certain anxiety symptoms. More accurate interpretations of emotional expressions could help children approach individuals who seem trustworthy or genuine; more positive social interactions could then decrease behavioral avoidance and subsequently improve experienced, felt, emotions.

4.4. Conclusion

Individuals are faced with a multitude of choices they have to make in the social world in order to adapt and benefit from qualitative relationships. These choices are informed by a multitude of factors which are interconnected. As children acquire knowledge of social norms, understanding the distinction between appearance and reality and comprehension of the fact that thoughts, actions and emotions can be hidden they use this information to decode and interpret other people's actions. It is this very understanding and its complexity which also generates their positioning towards truth and inauthenticity, resulting in a more lenient or a stricter attitude towards the person attempting to conceal their true thoughts or emotions. Individuals' views about deception and their perception of the authenticity of emotional cues are highly nuanced processes and are also gradually acquired and perfected during socio-emotional development. Their development might not follow a linear trajectory, being influenced by a variety of factors such as anxiety or school and interpersonal contexts.

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