Children’s fear reactions to the 2009 Swine Flu pandemic: The role of threat information as provided by parents

Danielle Remmerswaal*, Peter Muris

Institute of Psychology, Erasmus University Rotterdam, The Netherlands

ARTICLE INFO

Article history:
Received 11 May 2010
Received in revised form 17 September 2010
Accepted 12 November 2010

Keywords:
Children
Fear
Swine Flu
Parents
Threat information transmission

ABSTRACT

The purpose of the present study was to investigate the contribution of threat information as provided by the parents to the development of children’s fear within the context of the 2009 Swine Flu pandemic. Normal school children aged 7–12 years (N = 223) and their parents completed questionnaires to measure fear of the Swine Flu and general fearfulness for medical affairs. Children and parents were also asked to indicate to what extent parents had provided children with threat-related information about this disease. Results indicated that children’s fear of the Swine Flu was significantly related to parents’ fear of this disease. Further, it was found that parent’s transmission of threat information was positively associated with children’s fear and that this link remained significant when controlling for other sources of information (i.e., media, friends, and school) or direct experience with the disease. Most importantly, results showed that threat information as provided by the parents played a role in the association between parents’ and children’s fear. More precisely, support was found for a partial mediation model in which parents’ fear of the Swine Flu was related with parents’ threat information transmission, which in turn was associated with children’s fear of the disease.

© 2010 Elsevier Ltd. Open access under the Elsevier OA license.

1. Introduction

Specific fears are highly prevalent among children and can be seen as part and parcel of the normal development (Gullone, 2000). In most cases, these fears are short-lived and dissipate within months (Bauer, 1976; Ferrari, 1986). However, in a sizeable minority of children, specific fears persist and become invalidating in the sense that they interfere with normal functioning, and in these cases the diagnosis of a phobia should be considered (Muris, Merckelbach, Mayer, & Prins, 2000). Research has shown that the prevalence rates of childhood phobias vary between 2 and 9% (King, Muris, & Ollendick, 2004), and there is also evidence indicating that these problems tend to last into adulthood (e.g., Kessler et al., 2005).

Research has shown that fear and anxiety run in families and that part of this intrafamilial transfer can be attributed to environmental family factors (see for a review Bögels & Brechman-Toussaint, 2006). Contemporary etiological models assume that childhood phobias and anxiety disorders reflect extreme versions of normal developmental fears that have radicalized as a result of an interaction between a genetic vulnerability and fear-inducing learning events (Craske, 2003; Muris, 2007). With respect to the latter, Rachman (1977, 1991) has formulated his influential three-pathways theory, which postulates that there are three types of learning experiences involved in the acquisition of fears and phobias, namely conditioning (i.e., having an aversive encounter with the stimulus), modeling (i.e., observing another person reacting fearful to a stimulus), and negative information transmission (i.e., hearing that the stimulus is dangerous). There is now good evidence that these learning experiences play a role in the origins of childhood fears (Askew & Field, 2008; Field, 2006; Fisak & Grills-Taquechel, 2007; Muris & Field, 2010).

As for negative information transmission, there is increasing evidence indicating that this learning mechanism is involved in the transfer of fear from parents to their offspring. That is, in a recent experimental study by Muris, Van Zwol, Mayer, and Huijding (2010), it was investigated whether fear beliefs can be installed in children after parents had received negatively tinted information about a novel stimulus. Parents of children aged 8–13 years (N = 88) were presented with negative, positive, or ambiguous information about an unknown animal and then given a number of open-ended vignettes describing confrontations with the animal with the instruction to tell their children what would happen in these situations. Results indicated that children’s fear beliefs were...
influenced by the information that was provided to the parent. That is, parents who had received negative information provided more threatening narratives about the animal and hence installed higher levels of fear beliefs in their children than parents who had received positive information. Most importantly, in the case of ambiguous information, the transmission of fear was dependent on parents' trait anxiety levels. More precisely, high trait anxious parents told more negative stories about the unknown animal, which produced higher fear levels in children, which clearly points out that parents install fear in their children via the negative information pathway.

Furthermore, empirical data suggest that family influences, and in particular negative information transmission, are also involved in the transmission of anxiety-related cognitive biases from parents to their children. For example, Barrett, Rapee, Dadds, and Ryan (1996) demonstrated that a family discussion, during which parents prepared their offspring for a series of hypothetical ambiguous scenarios, increased interpretation bias in high anxious children. Other research by Creswell, Schmiering, and Rapee (2005) has shown that mothers' and children's biases in the interpretation of ambiguous situations were correlated, and Field and Cartwright-Hatton (submitted for publication) proposed that part of the overlap between parental and child anxiety can be explained by parents transmitting their own anxious cognitive biases to their children.

In the aforementioned experimental study by Muris et al. (2010), parents received explicit instructions to transmit the information they had received about the novel stimulus to their offspring. However, in real life parents may choose to conceal negative information from their children in order to prevent them to become anxious or upset. So, it remains to be seen whether the negative information pathway is at work within families, when parents face a realistic, potentially threatening stimulus or situation about which they can provide information to their offspring. The 2009 Swine Flu pandemic provided a unique naturalistic context to further explore this issue. In the Netherlands, the government put a lot of effort in informing the general population via various media channels (e.g., a television campaign, flyers in health centers and schools) about the dangerousness of the disease and ways to avoid contagion. It would be interesting to study to what extent parents employed this information to warn children about the Swine Flu, thereby possibly installing fear in their offspring. With this in mind, we conducted a survey in November 2009 at the peak of the Swine Flu pandemic in the Netherlands. Children completed a set of questionnaires for measuring (1) their fears in relation to the Swine Flu, (2) to what extent they had received threat-related information about this disease from their parents, (3) whether they had received such information from other sources (i.e., media, friends, and school) or knew someone who had contracted the disease (i.e., direct experience), and (4) general fearfulness for medical affairs. To cross-validate children's responses on parents' transmission of threat-related information about the Swine Flu, mothers and fathers also filled out scales assessing similar constructs. In this way, it became possible to investigate whether (a) parents' transmission of threat information about the Swine Flu was associated with children's fear levels of this disease, (b) the link between parents' transmission of threat information and children's fear of the Swine Flu remained significant when controlling for information from other sources and direct experience with the disease, and (c) the transmission of threat-related information by parents and as a result the enhancement of fear in children was primarily instigated by their own fears of the Swine Flu. With respect to this latter research goal, a mediation model was tested in which parents' threat information acted as a mediator in the relation between parents' and children's fear of the disease (see also Muris et al., 2010).

2. Method

2.1. Participants and procedure

Two-hundred-and-twenty-three children (104 boys and 119 girls) and their parents were recruited from three primary schools in South-Holland and Utrecht, the Netherlands. Mean age of the children was 9.97 years (SD = 1.26, range 7–12 years). As for the parents, 145 fathers (mean age = 44.57 years, SD = 4.89, range 34–62 years) and 202 mothers (mean age = 41.99 years, SD = 4.34, range 30–54 years) participated in the study. Parents of children in grades 6–8 of the schools (N = 415) received a letter providing them with information about the purpose and content of the study along with a consent form and a set of questionnaires, which they could fill out at home in case they decided to participate. Fifty-four percent of the parents responded favorably to this invitation by granting their child permission to participate, and by completing the set of questionnaires (at least one parent). Their children filled out the survey in their classroom under the supervision of the teacher and a female research assistant in order to ensure confidential and independent responding.

2.2. Questionnaires

2.2.1. Children

The Fear of Swine Flu Questionnaire (FSFQ) was construed for the purpose of the present study to measure children's fears in relation to the Swine Flu. The scale consists of 12 items (e.g., “Would you be scared if you had the Swine Flu?”, “Are you more afraid to become ill since the outbreak of the Swine Flu?”, “Would you be scared if someone you know would have the Swine Flu?”), which have to be answered on a 4-point Likert scale (1 = not true, 2 = somewhat true, 3 = true, 4 = very true). A total FSFQ-C score (Cronbach’s alpha = 0.81) can be computed (range 12–48), with a higher score indicating a higher level of fear of the Swine Flu.

The Sources of Information about the Swine Flu Scale (SISFS) consists of 10 items that intend to catalogue various ways along which children may have acquired knowledge about the Swine Flu. Most relevant for the present study were 4 items referring to parents’ transmission of negative information about the disease, which can be briefly labeled as “parents’ threat information” (e.g., “My parents warn me about the Swine Flu”; range 4–16). Additional items were concerned with the acquisition of such information via the media (2 items; e.g., “I hear scary things about the Swine Flu when watching television”; range 2–8), school (2 items; e.g., “There are posters hanging in the school about how to prevent contamination with the Swine Flu”; range 2–8), and friends (1 item; “My friends talk about the dangerousness of the Swine Flu”; range 1–4), or the direct experience with the disease (1 item; “I know someone who is infected with the Swine Flu”; range 1–4). Items of the SISFS are rated on a 4-point Likert scale ranging from 1 (not true) to 4 (very true), and (in case of multiple items) summed for each source of information. Cronbach’s alpha for the parents’ threat information scale was 0.79. For other SISFS variables, Cronbach’s alphas were not computed because these scales only consisted of 1 or 2 items.

A subscale of the shortened Fear Survey Schedule for Children-Revised (FSSC-R; Ollendick, 1983) was used to measure children’s general fear of medical affairs. This medical fear scale consists of five items (e.g., “Going to the doctor or dentist”, “Getting a shot from the doctor”) for which participants have to indicate their fear level on a 3-point Likert scale ranging from 1 (no fear) to 3 (a lot of fear). A total score can be obtained by summing the responses across all items (range 5–15; Cronbach’s alpha = 0.67). The FSSC-R is a widely used measure of childhood fear with good reliability and validity (e.g., Muris, Merckelbach, Ollendick, King, & Bogie, 2002).
difference was found for this variable. Finally, no significant dif-

tFSFQ scores were not significantly related to age and neither a sex

Second, children reported less fear of medical affairs as they became older. Third, children's medical fear scores, 

Table 1 displays partial correlation coefficients (corrected for gender and age) among the main variables that were assessed in this study. Most importantly, there were significant positive associations between parents' threat information and children's fear of the Swine Flu. That is, the more children indicated that their parents warned them about the dangerousness of the disease, the higher their fear levels for this disease (partial r(210) = 0.56, p < 0.001). This result was confirmed by the observation that parents' reports of warning children about the flu were also positively related to fear levels in their offspring (partial r(193) = 0.45, p < 0.001 for fathers and partial r(207) = 0.45, p < 0.001 for mothers). In addition, a number of other significant correlations are worthy of note. To begin with, children's and parents' fear levels of the Swine Flu were positively correlated (child–father: partial r(139) = 0.53, p < 0.001; child–mother: partial r(196) = 0.48, p < 0.001). Further, the transmission of threat information variables was all positively linked (partial rs between 0.44 and 0.63, all ps < 0.001), which provides some evidence for the convergent validity of the SISFS. Finally, positive correlations were observed between fear of Swine Flu as reported by the parents and their scores on the transmission of threat information scale (partial r(139) = 0.50, p < 0.001 for fathers and partial r(197) = 0.73, p < 0.001 for mothers). This indicates that higher levels of Swine Flu fear in parents were associated with higher levels of threat information as provided to their offspring.

3. Results

3.1. General results

Before addressing the main research questions, some general results will be discussed. First, a correlational analysis revealed a significant negative correlation between children's age and FSSC-R medical fear scores (r = −0.22, p < 0.01), which indicates that children reported less fear of medical affairs as they became older. Second, t-tests revealed a significant sex difference for FSSC-R medical fear scores, t(221) = 3.23, p < 0.01. Girls exhibited significantly higher levels of medical fear as compared to boys. Third, children's FSFQ scores were not significantly related to age and neither a sex difference was found for this variable. Finally, no significant differences were observed between fathers and mothers with respect to fear of the Swine Flu, medical fears, and the amount of threat information provided to their offspring, all ts ≤ 1.53, ps ≥ 0.13.

3.2. Relationship between parents' transmission of threat information and children's fear

Table 1 displays partial correlation coefficients (corrected for gender and age) among the main variables that were assessed in this study. Most importantly, there were significant positive associations between parents' threat information and children's fear of the Swine Flu. That is, the more children indicated that their parents warned them about the dangerousness of the disease, the higher their fear levels for this disease (partial r(210) = 0.56, p < 0.001). This result was confirmed by the observation that parents' reports of warning children about the flu were also positively related to fear levels in their offspring (partial r(193) = 0.45, p < 0.001 for fathers and partial r(207) = 0.45, p < 0.001 for mothers). In addition, a number of other significant correlations are worthy of note. To begin with, children's and parents' fear levels of the Swine Flu were positively correlated (child–father: partial r(139) = 0.53, p < 0.001; child–mother: partial r(196) = 0.48, p < 0.001). Further, the transmission of threat information variables was all positively linked (partial rs between 0.44 and 0.63, all ps < 0.001), which provides some evidence for the convergent validity of the SISFS. Finally, positive correlations were observed between fear of Swine Flu as reported by the parents and their scores on the transmission of threat information scale (partial r(139) = 0.50, p < 0.001 for fathers and partial r(197) = 0.73, p < 0.001 for mothers). This indicates that higher levels of Swine Flu fear in parents were associated with higher levels of threat information as provided to their offspring.

3.3. Relative contributions of various sources of threat information to children's fear

To examine the relative contributions of various sources of threat information to children's fear of the Swine Flu, a regression analysis was conducted in which SISFSs were entered simultaneously as the predictor variables and the FSFQ score was the dependent variable. As shown in Table 2, parents' threat information made a positive and significant contribution to children's fear scores, even when controlling for other sources of information about the Swine Flu (β = 0.50, p < 0.001). Note further that information from the media (β = 0.17, p < 0.01) and information from friends (β = 0.16, p < 0.01) were other independent and significant predictors of fear. Together the threat information variables accounted for 43% of the total variance in fear of the Swine Flu scores.
Regression analysis was used to examine whether threat information as provided by the parents acted as a mediator in the relation between parents’ and children’s fear of the Swine Flu. For this purpose, Baron and Kenny’s (1986) four steps approach for testing mediation effects was utilized. As a recap of previously discussed findings, it should be mentioned that the three prerequisites for such a mediation effect were all met. That is: (1) the predictors “fear of mother” and “fear of father” were significantly associated with the dependent variable “fear of child”, (2) the predictors “fear of mother” and “fear of father” were also significantly related to the mediator variable referring to “parents’ threat information” (child, mother, and father report), and (3) the mediator variable “parents’ threat information” was significantly linked to the dependent variable “fear of the child”. Fig. 1 displays the results of regression analyses to formally test whether the transmission of threat information by parents acted as a mediator in the relation between parents’ and children’s fear of the Swine Flu. As can be seen in Fig. 1A and B, child reports of parents’ threat information were found to be a partial mediator of the relations between fathers’ and mothers’ fear of the Swine Flu and children’s fear of the disease. More precisely, the relationships between mothers’/fathers’ and children’s fear of the Swine Flu was associated with the transmission of threat information as assessed by child, father, and mother report. The mediator “parents’ threat information” was entered in the regression model (Sobel statistics were 5.52 and 3.98, respectively, ps < 0.001). Comparable results were obtained when using father (Fig. 1C) and mother reports (Fig. 1D) of threat information transmission as the mediating variables (Sobel statistics were 7.04 and 5.10, respectively, ps < 0.001). As a final note, it should be mentioned that all regression analyses were carried out again while controlling for children’s or parents’ general medical fear scores. In all cases, the partial mediation effect of “parents’ transmission of threat information” on the link between parents’ and children’s fear of the Swine Flu was found.

4. Discussion

The present study examined the contribution of threat information as provided by parents to children’s fear within the context of the 2009 Swine Flu pandemic. Two-hundred-and-twenty-three children aged 7–12 years and their parents completed questionnaires for measuring fear beliefs in relation to the Swine Flu and to what extent children had received threat-information about the disease from parents and other sources. The main results can be summarized as follows. First, parents’ fear levels of the Swine Flu were significantly related to children’s fear level of this disease. Second, a significant positive relationship was found between parents’ transmission of threat information about the disease and children’s fear levels, and this link remained significant when controlling for other sources of threat information (i.e., media, friends, and school) or direct experience with the disease. Third and finally, support was also found for the hypothesis that negative information as provided by the parents acted as a mediator in the relationship between parents’ and children’s fear of the Swine Flu. Thus, parents’ fear of the Swine Flu was associated with the transmission of threat information to their offspring, which in turn was linked to children’s fear of the disease.

Fear, anxiety and their disorders run in families (Rapee, Schniering, & Hudson, 2009). For example, children of parents with anxiety disorders are at increased risk for developing anxiety problems (e.g., Beidel & Turner, 1997), while parents of children with anxiety disorders display an elevated incidence of these disorders themselves (e.g., Last, Hersen, Kazdin, Orvaschel, & Perrin, 1991).

### Table 2

<table>
<thead>
<tr>
<th>Source of Threat Information</th>
<th>B</th>
<th>SE</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information from parents</td>
<td>1.00</td>
<td>0.12</td>
<td>0.50*</td>
</tr>
<tr>
<td>Information from the media</td>
<td>0.88</td>
<td>0.30</td>
<td>0.17*</td>
</tr>
<tr>
<td>Information from school</td>
<td>0.09</td>
<td>0.22</td>
<td>0.02</td>
</tr>
<tr>
<td>Information from friends</td>
<td>1.58</td>
<td>0.56</td>
<td>0.16</td>
</tr>
<tr>
<td>Direct experience</td>
<td>-0.50</td>
<td>0.27</td>
<td>-0.10</td>
</tr>
</tbody>
</table>

Note: N = 207. SISFS = Sources of Information about the Swine Flu Scale. R² for regression model was 0.43 [F(5,205) = 31.43, p < 0.001].

* p < 0.05.

** p < 0.01.

3.4. Threat information as a mediator in the link between parent and child fear
The mechanisms by which fear and anxiety are transmitted from parents to their offspring are not well understood. Besides genetic transmission (see Eley & Gregory, 2004), at least part of the intergenerational transfer of fear and anxiety can be ascribed to anxious rearing behaviors of parents (Bögels & Brechman-Toussaint, 2006; Wood, McLeod, Sigman, Hwang, & Chu, 2003). The current data are in keeping with the previous study by Muris et al. (2010) in that they show that verbal information transmission is one way by which parents may pass on their own fear and anxiety to their offspring (Rachman, 1977, 1991).

It will be important for future research to explore the precise role of information transmission in this transfer of fear and anxiety from parents to children. As noted earlier, one possibility is that fearful and anxious parents are prone to develop cognitive distortions which are then passed to their children via the verbal information pathway (Field & Cartwright-Hatton, submitted for publication). Thus, children may be trained by their parents to interpret ambiguity and to process fear-related information in a threatening way and as a result develop fear and anxiety (Field & Lester, 2010).

Besides information from parents, the data also indicated that threat information from other sources made a significant contribution to children’s fear of the Swine Flu scores. More specifically, information from the media and information from friends were also uniquely associated with children’s fear of this disease. The fact that children develop fear after being exposed to threat information as provided by the media (and in particular television) has been well-documented in the literature (Cantor, 1998; see Muris & Field, 2010), but few studies have investigated the negative impact of threat information from peers on childhood fear (but see Field, Argyris, & Knowles, 2001; Field, Hamilton, Knowles, & Plews, 2003) and clearly this issue needs further empirical research. Together various sources of information accounted for 43% of the total variance in children’s fear of the Swine Flu scores. Although certainly underlining the role of threat information in this type of childhood fear, this result points out that other factors (e.g., genetics, modeling, conditioning, cognitive development) are also involved (Muris, 2007).

A number of other results of this study are also worthy of note. First of all, direct experience with the disease did not make a significant contribution to children’s fear of the Swine Flu scores. This may well have to do with the way this variable was assessed. More precisely, direct experience with the Swine Flu was measured by means of 1 item, which had a rather a-specific content (i.e., “I know someone who is infected with the Swine flu”). Note that this item may refer to various types of events. On the one hand, children may have had the experience that someone was seriously ill and (almost) died as a result of the Swine Flu, which is likely to enhance their fear of the disease. On the other hand, it is also possible that children knew someone who had contracted the Swine Flu but nevertheless displayed fairly mild symptoms, which of course would reduce their fear level. Second, boys and girls displayed comparable levels of fear in relation to the Swine Flu, in spite of the fact that girls did exhibit higher levels of medical affairs in general as compared to boys, which is more in keeping with the existing literature on gender differences in childhood fears (e.g., Craske, 1997). Third, fathers and mothers did not differ in their level of fear of the Swine Flu and the amount of threat information they provided to their children. Moreover, a highly similar pattern of results was observed for fathers and mothers with regard to the effect of this information on children’s fear of the disease. This result demonstrates that the verbal threat information operates in a similar way in both parents. However, this does not mean that there may not be other differences between fathers and mothers in the way they deal with other types of threat within the context of raising their offspring (Bögels & Phares, 2008).

It should be admitted that the present study suffers from various limitations. To begin with, due to the correlational design of the study, it is not possible to draw conclusions on cause–effect relationships. A second limitation is that almost 50% of children and parents who were approached for this study did not participate, which of course raises questions regarding the generalizability of the current findings. A third and final limitation pertains to the self-report measures that we employed. For example, it can be argued that the SISFS merely measured parents’ and children’s attributions rather than the actual role of threat information as a causal factor in the emergence of children’s fear of the Swine Flu. Despite these shortcomings, the data provide further support for the idea that verbal threat information promotes children’s fear (Muris & Field, 2010), and that parents play an important role in the acquisition of fear along this pathway (Muris et al., 2010). A strong point of the present study was that the effects of parental information on children’s fear were examined under ecologically valid conditions. Meanwhile, it remains to be seen whether parental information also has therapeutic potential. Recent research has indicated that verbally acquired fear and avoidance behavior can be effectively reduced by providing children with positive information about a potentially threatening stimulus (Kelly, Barker, Field, Wilson, & Reynolds, 2010; Muris, Huijding, Mayer, Van As, & Van Alem, in press), and it might be interesting to investigate to what extent positive information as given by parents can be employed as an intervention to prevent children from developing excessive fears.

References


