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Mapping People's Positions Regarding the Acceptability of Somatic Gene Therapy

Les Positions du Public sur l'Acceptabilité de la Thérapie Génique Somatique

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Abstract

Introduction: As gene therapy entails potential drawbacks, studies are needed in order to know people's opinions regarding its use.

Objectives: The present study examined French people's positions regarding somatic gene therapy.

Method: A sample of 224 adults living in various areas in France was presented with 32 realistic scenarios that were created by orthogonally combining the levels of four factors: the type of illness (e.g., hemophilia), the probability of transmission of the pathogenic gene, the technique used (e.g., transfer of a functional gene just after birth), and the probability of success of the therapy.

Results: Through cluster analysis, six qualitatively different positions were found: *Never very acceptable* (8% of the sample, mostly males and more educated people), *Legalist* (17%, mostly people who have been informed of the legal and technical aspects of the therapy), *Depends on the chances of success* (18%), *Fully acceptable after birth* (5%), *Fully acceptable before birth* (8%), and *Quite always acceptable* (33%, mostly older people with children).

Conclusion: Although it has some few detractors, the recourse to gene therapy seems to be well accepted by a majority of the participants, and this high level of acceptance holds whether the pathology considered is hemophilia, immunodeficiency, propensity to develop cancer, or cardio-vascular pathology.

Keywords: somatic gene therapy; acceptability; people's positions; France

Résumé

Introduction: La thérapie génique n'est pas sans risques. Il est donc important de connaître l'opinion des personnes sur ses utilisations cliniques.

Objectifs: Les positions des Français sur l'utilisation de la thérapie génique somatique ont été analysées.

Méthode: On a présenté à un échantillon de 224 adultes vivant dans différentes régions de France un ensemble de 32 scénarios réalistes obtenues par croisement orthogonal des niveaux de quatre facteurs: le type de maladie génétique qu'il est possible de prévenir (ex., homophilie), la probabilité de la transmission du gène défectueux, la technique de correction employée (ex., transfert d'un gène fonctionnel juste après la naissance), et les chances de succès de la thérapie.

Résultats: Une analyse en clusters a mis en évidence six positions qualitativement différentes: *Jamais très acceptable* (8% de l'échantillon, surtout des hommes et des participants très éduqués), *Légaliste* (17%, surtout des participants qui avaient été informés des aspects techniques et légaux de la procédure), *Dépend des chances de succès* (18%), *Totalement acceptable après la naissance* (5%), *Totalement acceptable avant la naissance* (8%), et *Essentiellement acceptable* (33%, surtout des participants plus âgés, ayant des enfants).

Conclusion: Bien qu'il ait quelques détracteurs, le recours à la thérapie génique somatique semble être bien accepté par les participants. Le haut niveau d'acceptation vaut quel que soit la pathologie considérée dans l'étude: hémophilie, immunodéficiência, probabilité de développer un cancer ou pathologie cardio-vasculaire.

Mots-clés : thérapie génique somatique ; acceptabilité ; positions personnelles ; France

Mapping People's Positions Regarding the Acceptability of Somatic Gene Therapy

Genetic diseases result from mutations in the genome. Gene therapy corrects the function of the mutated genes by introducing a non-mutated gene into the genome of the cells in the affected tissues. In the 1980s, gene therapy research was conducted only on animals. In 1990, the first successful attempt at gene therapy in humans was for a metabolic disorder that caused immunodeficiency. In 1993, the first somatic treatment generating a permanent genetic modification cured a malignant brain tumor. After years of sidelining gene therapy due to clinical failures, the confidence of researchers and practitioners in the possibilities of gene therapy was regained by mid-2000 and steady progress has been made since then (Wirth et al., 2013).

The technique currently in use is adapted from the Clustered Regularly Interspaced Short Palindromic Repeat-associated protein system (Hsu et al., 2014). It can be applied *in vitro* or *ex vivo* (Kolata et al., 2018). As the replacement gene makes possible the production of normal proteins, the affected tissues can subsequently self-repair. Gene therapy specifically targets rare diseases caused by the mutation of a single, well-known gene (e.g., hemophilia), and for which no alternative treatments are available. Gene therapy can be applied either to somatic cells or to reproductive cells. In the first case, any change in the cells is restricted to the patient who has been treated. In the second case, changes can affect this patient's descendants.

Somatic gene therapy, although intended to affect only individual patients, is not without risks (Deakin et al., 2013). As the vector carrying the gene is a foreign substance, it activates the receiver's immune system, which tries to destroy it. This vector itself can be toxic or produce inflammatory responses, and even induce a tumor. In addition, the non-mutated gene introduced into the target tissues must remain functional enough time before the

therapy can become a permanent cure. In some cases, the reproductive cells may be unintentionally altered. Finally, as several common diseases are affected by multiple genes, the therapy may be very complicated and, as a result, very expensive.

People's Views About Somatic Gene Therapy

As somatic gene therapy entails potential drawbacks, studies have been conducted over the past thirty years in order to know people's opinions regarding its use. Blendon et al. (2016) analyzed the results of 17 public opinion polls, conducted in the US, about the acceptability of gene therapy. They found that, from 1985 to 2015, a majority of the public approved gene therapy when it was used for the purpose of improving patients' health (from 65% to 87% agree) or in view of reducing the risk of illness in the future (77%). A majority also approved gene therapy aimed at preventing children to inherit fatal genetic diseases (84%) or nonfatal birth defects (73%). A substantial minority (36%) approved changing genes before birth in view of reducing the risk of fatal disease (see also, Funk & Hefferon, 2018; Robillard et al., 2014; Scheufele et al., 2017).

There positive views about gene therapy seems to be shared by many people in the world. Gaskell et al. (2017) presented participants from 11 countries ($N = 11,716$) with a vignette in which prenatal somatic therapy was used as a mean to cure a disease. To the question "Would you make the same decision as these people", participants' level of agreement was quite high ($M = 6$ on a 0-10 point scale). Differences as a function of country were found however: Mean ratings were, for example, lower in Austria ($M = 5$) than in Hungary, Portugal or Spain ($M = 8$). Wang et al. (2017) compared the views of the public in China ($N = 11,036$) and the views of Chinese physicians ($N = 2,165$). Overall people tended to agree with the idea that "gene therapy will be helpful in addressing health needs of patients over the next few years" ($M = 4.82$, on a 1-7 scale), (b) "if it were possible to cure people with fatal diseases by gene therapy, those people ought to be allowed to do this ($M = 5.59$),

(c) “if they had a child with a usually fatal genetic disease, such as Down Syndrome, sickle cell anemia, muscular dystrophy, they would be willing to have child undergo gene therapy to have their genes corrected ($M = 5.75$), and (d) “if gene therapy is able to change a child’s inherited characteristics by changing the child’s genetic structure in the womb before they were born and they were making the decision, would they consider doing so to improve his/her general physical health ($M = 4.70$). The Chinese physicians’ views were not very different ($M = 5.08, 5.81, 6.00, 4.73$, respectively) (see also, Xiang et al., 2015).

These positive views seem to extend to some degree to the much newer and highly controversial technique of gene editing. For example, McCaughey et al. (2016) analyzed responses from 10,067 people across 185 countries to a questionnaire on gene editing. Overall, 59 % supported the use of gene editing in children (and adults), and 63% supported embryonic editing to cure either life threatening diseases or debilitating diseases. The higher the country GDP, the higher the level of support (see also, Uchiyama et al., 2018; Armsby et al., 2019).

The Present Study

The present study examined French people’s positions regarding somatic gene therapy. In France, somatic gene therapy is permitted but any change in reproductive cells is prohibited (Article 16-4 of the French Civil Code). In addition, somatic gene therapy is allowed only if it is performed after birth; any genetic change in the embryo is prohibited (Conseil National d’Ethique, 1990).

The present study used a scenario-based technique. Recent application of this technique to ethical issues related to reproduction can be found in Muñoz Sastre et al. (2016), Pajot et al. (2017), and Vera Cruz et al. (2019). In the present study, this technique was selected because it allowed assessing the effect on acceptability of the specific circumstances in which gene therapy was implemented. Four circumstances were considered in the

scenarios: the type of disease likely to be transmitted from the parents to the child (e.g., hemophilia), the likelihood of such transmission, the technical procedure used (e.g., modification of defective genes in the egg), and the current likelihood of success of that procedure.

The type of disease and the probability of success were taken into account because the effect on acceptability of these contextual factors has not been evaluated in previous studies. The probability of transmission and the technical procedure were considered because, as shown for example by Blendon et al. (2016), the level of acceptability was conditioned by these two factors. In particular, people in the United States were strongly divided on the issue of gene editing before birth.

In view of the current legislation in France, and in view of the findings reported above, several qualitatively different positions were expected. Firstly, a *legalist* position was expected. For some participants, those who tend to agree with current national laws, gene therapy would be judged acceptable when performed after birth and would be judged unacceptable if performed before birth. Secondly, an *Always unacceptable* position was expected because, in all the studies mentioned above, a non-negligible percentage of participants (e.g., from 15% to 25% in the study by Blendon et al., 2016) were hostile to any kind of gene therapy. Thirdly, an *Always acceptable* position was expected because in many studies reported above, a non-negligible percentage of participants approved gene therapy whether it was performed on the embryo or at a later stage (McCaughey et al., 2016). Finally, other positions were also expected, namely a position that would take into account the chances of success of the procedure (in combination with other factors), and a position that would take into account the kind of illness that would be prevented. Previous studies of public acceptance of medical procedures to prevent disease have shown that the effectiveness of the

procedure and the type of disease matter (e.g., in the case of vaccination, Kpanake et al., 2016, 2018ab; Vera Cruz et al., 2020).

The present study was also aimed at examining some of the determinants of these positions. Namely, we expected that (a) male participants, younger participants and more educated participants, more often than female participants or older participants or less educated participants, would find somatic gene therapy acceptable, overall or under specific circumstances (Delhove et al., 2019), and (b) participants who have received information regarding gene therapy would, more often than other participants, express a *legalist* position.

Method

Participants

The participants were 224 adults (among them 37 healthcare professionals) living in various areas in France, aged 18-87 years ($M = 38.11$, $SD = 16.62$). The researcher contacted 400 people walking along city sidewalks. Of these, 56% participated. The professionals were mostly nurses. Table 1 shows the demographic characteristics of the sample. The main motive given for not participating was lack of time.

Material

The material was composed of 32 vignettes showing a realistic story and a response scale. These vignettes were created by orthogonally combining the levels of four factors: (a) the type of illness (cardio-vascular pathology or propensity to develop cancer or immunodeficiency or hemophilia), (b) the probability of transmission (very high or not negligible), (c) the technique used (alteration of defective genes in the egg or transfer of a functional gene just after birth), and (d) the probability of success of the therapy (one in two chances or four in five chances). In each of these stories, it was indicated that the defective gene came from the mother's family.

An example of a scenario is the following: “Madame and Monsieur Durant wish to have a child. They know that, in Madame Durant’s family, a defective gene has, in the past, been responsible for a disease that has affected many family members. It is a **severe cardiovascular disease**, which manifests itself quite soon in the development of the person. According to the experts, the probability that the illness is transmitted to descendants is **very high**. Recent progress in gene therapy allows eliminating the risk of transmission. The technique consists in **altering the defective gene in the egg**. During in vitro fecundation, a corrective molecule is introduced in the eggs, which replaces the defective gene by a functional gene. Then, the egg is implanted back into the womb. The chances of success of this kind of therapy are now **very high: about eight chances out of ten**. Madame and Monsieur Durant wish to have recourse to this kind of gene therapy. To what extent do you approve their decision?” The response scale was an 11-point scale with two anchors labeled ‘Not at all’ and ‘Completely.’

Procedure

Data collection took place from 2017 to 2019. It was completed in a quiet room, usually in the participant’s home. Each person was tested individually. Ninety-nine randomly selected participants were given technical and legal information about gene therapy before the test took place. The remaining participants were simply informed about the task.

The procedure followed Anderson's (1997, 2008, 2019) recommendations for this type of study (see also Munoz Sastre & Mullet, 2019). It consisted of two phases. In the familiarization phase, participants were told that they were about to read a number of stories in which parents wanted to use gene therapy to cure their baby, and that they were to judge how acceptable they found the parents' decision in each case. Next, each participant was presented with one of twelve stories randomly selected from the entire series. After reading the story, they made an acceptability assessment. They then read the second story, and so

forth. After completing the twelve assessments, participants were allowed to revisit their acceptability assessments, compare them, and modify them. The main purpose of this familiarization step was to help participants develop a frame of reference for the task, to stabilize the subjective values they ascribed to the various pieces of information featured in each of the stories, and to enable them to achieve consistency in the way they integrated these pieces of information when forming their acceptability assessments. Participants were also given explanations about the use of the rating scale, and the experimenter never mentioned her own position regarding gene therapy.

In the next experimental phase, participants were given the set of cards, one at a time. They made their acceptability assessments at their own pace, but were no longer permitted to go back and make changes. The vignettes were always presented in random order. Participants took between 35 and 55 minutes to complete the assessments. No participants complained about the number of vignettes or the credibility of the situations presented.

Results

A cluster analysis, using the K-means procedure (Hofmans & Mullet, 2013) was first applied in order to detect qualitatively different patterns of ratings. “K-means clustering is non-hierarchical and centroid-based, popular because it is simple and less susceptible to outliers or specifics of the distance measure than other methods” (Mullet et al., 2016, p. 191). A seven-cluster solution was retained. An overall ANOVA was conducted with a design of Cluster \times Therapy \times Transmission \times Illness \times Success, $7 \times 2 \times 2 \times 4 \times 2$. Owing to the great number of comparisons, a Bonferoni correction was applied and the significance threshold was set at .001 (.05/31). As the cluster effect, $F(6, 217) = 257.28$, the Cluster \times Therapy interaction, $F(6, 217) = 109.12$, and the Cluster \times Success interaction, $F(6, 217) = 223.22$, were significant, seven separate ANOVAs were conducted at the cluster level. The results are shown in Table 2.

The first cluster (8% of the sample) was the expected never acceptable cluster. All ratings were low ($M = 2.53$, $SE = 0.83$). As shown in Figure 1 (left-hand panel), they were, however, slightly higher when the chances of success were high ($M = 3.04$, $SE = 0.70$) rather than low ($M = 1.82$, $SE = 0.88$), and when the therapy was applied after ($M = 2.74$, $SE = 0.78$) rather than before ($M = 2.13$, $SE = 0.89$) birth. This position was called *Never very acceptable*. As can be observed in Table 1, it was more often expressed by males, by participants aged 26-30, and by participants with a university degree than by females, older participants or participants without a college degree.

The second cluster (17% of the sample) was the expected *Legalist* cluster. As shown in Figure 1 (second panel), ratings were considerably higher when the therapy was applied after ($M = 6.89$, $SE = 0.56$) rather than before ($M = 2.72$, $SE = 0.64$) birth. In addition, they were also higher when the chances of success were high ($M = 5.09$, $SE = 0.50$) rather than low ($M = 4.52$, $SE = 0.63$). As can be observed in Table 1, this position was more often expressed by participants who were given technical and legal information before testing than by participants who were not given the information.

The third cluster (18% of the sample) was called *Depends on the chances of success* because this factor was by far the one that most influenced the ratings. As shown in Figure 1 (second panel), (a) when the chances were high, ratings were high ($M = 7.92$, $SE = 0.48$), and (b) when the chances were 50-50, ratings were close to the middle of the response scale ($M = 5.62$, $SE = 0.60$). In addition, ratings were slightly higher when the illness was propensity to develop cancer ($M = 6.97$, $SE = 0.36$) than when it was hemophilia ($M = 6.55$, $SE = 0.41$). It was still higher when the probability of transmission of this propensity was high ($M = 7.30$, $SE = 0.49$) rather than non-negligible ($M = 6.65$, $SE = 0.52$).

The fourth cluster (5% of the sample) was similar to the *Legalist* cluster except that, in this case, ratings were always located in the acceptability area of the response scale. As shown

in Figure 1 (fourth panel), they were high when the therapy was applied after birth ($M = 8.93$, $SE = 0.98$), and only slightly lower ($M = 6.67$, $SE = 1.12$) when the therapy was applied before birth. In addition, ratings were slightly higher when the chances of success were high ($M = 8.10$, $SE = 0.88$) rather than low ($M = 7.49$, $SE = 1.11$). This position was called *Fully acceptable after birth*.

The fifth cluster (8% of the sample) was, as shown in Figure 1 (fifth panel) the exact inverse of the preceding cluster. Ratings were high when the therapy was applied before ($M = 9.35$, $SE = 0.92$) birth, and slightly lower ($M = 7.07$, $SE = 0.80$) when the therapy was applied after birth. In addition, as in the preceding cluster, ratings were slightly higher when the chances of success were high ($M = 8.67$, $SE = 0.72$) rather than low ($M = 7.75$, $SE = 0.90$). Also, the effect of the chances of success was stronger when the therapy was applied after birth ($7.70 - 6.44 = 1.26$) than before birth ($9.64 - 9.06 = 0.58$). This position was called *Fully acceptable before birth*.

The sixth cluster (33% of the sample) was called *Quite always acceptable* because all ratings were high ($M = 8.74$, $SE = 0.55$). As shown in Figure 1 (right-hand panel), they were, however, slightly higher when the chances of success were high ($M = 9.11$, $SE = 0.36$) rather than low ($M = 8.37$, $SE = 0.45$). They were also slightly higher when the illness was propensity to develop cancer ($M = 8.88$, $SE = 0.27$) than when it was hemophilia ($M = 8.59$, $SE = 0.31$). As can be observed in Table 1, this position was more often expressed by older participants (aged 31+) and by participants with children than by younger participants (aged 18-30) or participants without children.

The seventh cluster (11% of the sample, not shown) was called *Undetermined* because ratings never deviate much from the middle of the scale ($M = 5.61$). They were, however, slightly higher when the chances of success were high ($M = 6.02$, $SE = 0.63$) rather than low ($M = 5.21$, $SE = 0.78$). As can be observed in Table 1, this absence of position was less often

found among participants who were given technical and legal information before testing than among participants who were not given the information.

Discussion

As expected, a *Legalist* position was found, and this position was more often found among participants who were given technical and legal information about gene therapy, before the testing sessions. It was, however, a minority position, even among those who received the information: 67% of the participants who received it expressed a position that was at variance with the legal position, and, among them, 8% expressed a position that was the inverse of the official position; that is, they considered that gene therapy was more acceptable before birth than after birth. This last result was reminiscent of Armsby et al.'s (2019) finding that the percentage of experts approving embryonic therapy was higher than the percentage of experts approving gene therapy after birth. In addition, 5% of participants expressed a position that was similar to the legalist one although they considered that gene therapy before birth, if not fully acceptable was, however, "tolerable". **Such a mismatch between the legal requirements in a country and the positions of citizens is not specific to the situation examined in this study. Munoz Sastre et al. (2015), in a study on the acceptability of abortion, for example, showed that only 23% of their sample expressed a *Legalist* position.**

The most frequent position (33%) was the expected *Always acceptable* position. A variant of this position was also observed: 18% considered that if the chances of success were 50-50, then gene therapy was still acceptable, although less than if chances were higher. **This finding was consistent with most findings analyzed earlier (e.g., Blendon et al., 2016; Gaskell et al. (2017).** Contrary to our expectation, however, the *Always acceptable* position was more often expressed by older participants with children than by young participants without children. This result may possibly be explained by the fact that parents may be more concerned about children's health and wellbeing than may people without offspring. There is

also the possibility that older participants may be less concerned than younger participants about anything related to genetic manipulation.

As also expected a *Never acceptable* position was found. It was very much a minority position, which was consistent with findings from previous studies (e.g., Blendon et al., 2016; Gaskell et al., 2017). Contrary to our expectation, however, this position was more often expressed by males than by females, and by more educated participants than by less educated participants. This result may possibly be explained by the fact that participants with a university degree may have been sensitized, more than others, to the issue of genetic manipulations, and more so if they were males.

Finally, 11% of participants expressed no position. This result, while disconcerting at first glance, was consistent with previous studies of complex societal issues that allow people to express a non-position (Johnston Conover et al., 2002). These authors listed the reasons for non-positioning in such cases: perceived insufficient knowledge, perceived incompetence in the field, fear of publicly expressing preferences, fear of holding unwanted opinions, genuine doubt, and protection from perceived invasion of privacy. In this case, we can assume that the first, second and fourth reasons are at work: When information was provided, the percentage of undetermined participants decreased significantly. This is methodologically important. If participants in this sample had been asked to provide only one response – to a generic question or to a single scenario – their responses would have been interpreted as moderate support for gene therapy in all cases. By asking participants to respond to a number of structured scripts, it was possible to distinguish between no opinion and moderate support.

Limitations

Our study has limitations. Firstly, since we studied a convenience sample of lay people, our findings must be generalized with care and need to be replicated both in France and in other European countries. They are, however, consistent with those of previous studies

on people's views regarding the clinical use of gene therapy. Secondly, we used vignettes, not real cases. Even though reading vignettes is very different from seeing patients, vignettes are commonly used in studying professionals' and lay people's judgments and decisions, and their use has been validated (e.g., Fruchart et al., 2007). In the current study, we used typical cues, and presented realistic situations in the vignettes (which could have described cases in the local hospital). The participants had little trouble in making judgments; this is an important sign of the validity of the vignettes: if the situations had been non-ecological, the judgment process would have been much more laborious for everybody.

Implications

Although it has some few detractors, the recourse to gene therapy seems to be well accepted by a majority of the participants, and this high level of acceptance hold whether the pathology considered is hemophilia, immunodeficiency, propensity to develop cancer, or cardio-vascular pathology. Many of them are even of the opinion that embryonic gene therapy should also be allowed. Since socio-demographic variables have relatively little effect on the positions expressed, it is likely that similar results would be found in larger and more representative samples.

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Table 1.

Demographic Characteristics of the Sample. Composition of the Clusters

	Cluster							Total
	NVA	LEG	DPS	FAA	FAB	QAA	UND	
Gender								
Male	11(14) ^a	14(18)	14(18)	6(8)	6(8)	21(27)	5(7)	77
Female	8(5) ^a	23(16)	27(18)	6(4)	12(8)	52(35)	19(13)	147
Age								
18-25 Years	4(7)	10(18)	12(21)	6(10)	4(7)	12(21) ^{ab}	9(16)	57
26-30 Years	11(18) ^{ab}	11(18)	12(20)	1(2)	4(7)	16(27) ^c	5(8)	60
31-50 Years	1(2) ^a	6(11)	8(15)	1(2)	6(12)	24(46) ^{ac}	6(12)	52
51+ Years	3(6) ^b	10(18)	9(17)	4(7)	4(7)	21(38) ^{bc}	4(7)	55
Children								
No	13(11)	22(18)	25(20)	7(6)	9(7)	32(26) ^a	14(12)	122
Yes	6(6)	15(15)	16(15)	5(5)	9(9)	41(40) ^a	10(10)	102
Education								
Primary	3(5)	9(16)	8(14)	4(7)	6(11)	21(37)	6(10)	57
Secondary	3(6)	9(18)	9(18)	3(6)	4(8)	14(28)	8(16)	50
College	2(4) ^a	8(16)	13(26)	4(8)	6(12)	13(26)	4(8)	50
University	11(16) ^a	11(17)	11(17)	1(1)	2(3)	25(37)	6(9)	67
Religious Involvement								
Atheist	16(10)	24(15)	30(18)	9(5)	12(7)	53(32)	21(13)	165
Believer in God	0(0)	7(22)	9(28)	1(3)	3(9)	11(35)	1(3)	32

Regular Attendee	3(11)	6(22)	2(8)	2(8)	3(11)	9(33)	2(7)	27
Works in the Healthcare Sector								
No	14(8)	31(17)	34(18)	10(5)	16(9)	60(32)	21(11)	186
Yes	5(14)	6(16)	6(16)	2(6)	2(5)	13(35)	3(8)	37
Genetic Illness								
No	19(9)	37(17)	39(18)	11(5)	17(8)	71(33)	23(10)	217
Yes	0(0)	0(0)	2(29)	1(14)	1(14)	2(29)	1(14)	7
Genetic Illness in Family								
No	16(9)	29(16)	36(20)	8(4)	15(8)	61(33)	19(10)	184
Yes	3(7)	8(20)	5(13)	4(10)	3(7)	12(30)	5(13)	40
Has Heard About Gene Therapy Before								
No	10(9)	20(18)	20(18)	6(5)	11(10)	35(32)	8(7)	110
Yes	9(8)	17(15)	21(19)	6(5)	7(6)	38(33)	16(14)	114
Condition								
No Information	10(8)	10(8) ^a	23(18)	7(6)	12(10)	45(36)	18(14) ^a	125
Information	9(9)	27(27) ^a	18(18)	5(5)	6(6)	28(29)	6(6) ^a	99
Total	19	37	41	12	18	73	24	224

Figures in parenthesis are percentages computed in row. Figures with the same superscript are significantly different, $p < .05$. NVA = Never Very Acceptable, LEG = Legalist, DPS = Depends on Probability of Success, FAA = Fully Acceptable After Birth, FAB = Fully Acceptable Before Birth, QAA = Quite Always Acceptable, UND = Undetermined.

Table 2.

Main Results of the ANOVAs Conducted at the Cluster Level

Cluster and Factor	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η^2_p
Cluster Never Very Acceptable					
Therapy	1	56.90	11.27	.01	.38
Transmission	1	5.53	1.86	.19	.09
Illness	3	0.83	0.75	.53	.04
Success	1	227.61	10.40	.001	.37
Cluster Legalist					
Therapy	1	5 156.96	200.42	.001	.85
Transmission	1	0.00	0.00	.98	.00
Illness	3	0.95	0.45	.72	.01
Success	1	98.21	17.97	.001	.33
Cluster Depends on Probability of Success					
Therapy	1	43.90	6.85	.01	.15
Transmission	1	35.56	4.62	.04	.10
Illness	3	10.34	9.33	.001	.19
Success	1	1 733.28	365.20	.001	.90
Transmission x Illness	3	3.76	6.51	.001	.14
Cluster Fully Acceptable After Birth					
Therapy	1	490.51	82.55	.001	.88
Transmission	1	0.51	1.32	.27	.11
Illness	3	1.43	2.22	.10	.17
Success	1	36.26	10.71	.01	.49

Cluster Fully Acceptable Before Birth

Therapy	1	747.11	74.30	.001	.81
Transmission	1	1.36	1.79	.20	.10
Illness	3	0.39	0.43	.73	.02
Success	1	121.00	45.27	.001	.73
Therapy x Success	1	16.67	13.41	.001	.44

Cluster Quite Always Acceptable

Therapy	1	13.72	7.56	.01	.10
Transmission	1	26.97	11.00	.01	.13
Illness	3	9.21	10.96	.001	.13
Success	1	318.82	64.76	.001	.47

Cluster Undetermined

Therapy	1	158.60	13.07	.01	.36
Transmission	1	44.56	18.67	.001	.45
Illness	3	18.63	3.42	.02	.13
Success	1	124.32	23.06	.001	.50

Figure 1.

The main patterns of data that correspond to the six clusters (never, legalist, success, after birth, before birth, and acceptable). In each panel, approval of the parents' decision is on the vertical axis, and the combined levels of the risk of transmission factor and of the technique used factor are on the horizontal axis (BM = Before birth and Medium risk, BH = Before birth and High risk, AM = After birth and Medium risk, AH = After birth and High risk). The two curves correspond to the two levels of the chances of success factor. Each panel corresponds to one cluster.

