# Judgments of Blame and Forgiveness: A Comparison of Young Adults, Older Adults, and Older Adults with Dementia

Valentin Decroix, Éric Fruchart, Patricia Rulence-Pâques

# Judgments of Blame and Forgiveness: A Comparison of Young Adults, Older Adults, and Older Adults with Dementia

Valentin Decroix [1], Eric Fruchart [2], & Patricia Rulence-Pâques [3]

University of Perpignan Via Domitia[1,2], Perpignan, France

University of Lille III[3], Calais, France

## Abstract

*Introduction:* Alzheimer's disease may modify moral judgment.

*Objective:* In two studies, we assessed the impact of dementia on blame and forgiveness. Study 1 compared the ways in which young adults, older adults, and older adults with dementia cognitively integrated two factors. Study 2 assessed the number of different factors that older adults with dementia were able to integrate during these moral judgments.

*Method*: The participants recorded their moral judgements in a blame task and in a forgiveness task. In study 1, the two questionnaires contained scenarios built from the combination of two factors. In study 2, the participants were confronted with the same tasks under three different conditions with scenarios that combined three, four or five factors.

*Results*: The data from study 1 showed that the older adults with dementia did not combine the two factors in the same way as young adults did: the combination depended on the type of moral judgment. Study 2 revealed differences in moral judgment between older adults with dementia and adults without dementia in all tasks (i.e. with three, four or five factors combined).

*Conclusion*: Dementia has an impact on moral judgments. Moral judgment among people with dementia is both task- and condition-dependant.

*Keywords:* dementia, information integration, moral judgment, older adults.

# Jugements de Blâme et de Pardon : Une Comparaison entre de Jeunes Adultes, des Personnes Agées et des Personnes Agées Atteintes de Démence


## Résumé

*Introduction* : La maladie d'Alzheimer peut modifier les jugements moraux.

*Objectifs* : Deux études ont été menées pour estimer l'impact de la démence sur les jugements de blâme et de pardon. La première étude a comparé la manière dont les jeunes adultes, les personnes âgées en bonne santé et les personnes âgées atteintes de démence ont intégré cognitivement deux informations. La deuxième étude a comparé leur capacité à intégrer plus de deux informations pour établir leurs jugements.

*Méthode* : Les participants ont rendu leurs jugements moraux via deux tâches (jugement de blâme et jugement de pardon). Dans l'étude 1, deux questionnaires ont été proposés comprenant des scénarios construits à partir de la combinaison de deux informations. Dans l'étude 2, les participants ont été soumis aux mêmes tâches dans 3 conditions différentes proposant des scénarios dans lesquels 3, 4, ou 5 informations ont été combinées.

*Résultats* : L'étude 1 a révélé que les personnes âgées atteintes de démence n'ont pas combiné les deux informations de la même manière que les jeunes adultes. Leur combinaison dépendait du type de jugement moral. Dans l'étude 2, des différences sont apparues lorsque 3, 4, ou 5 informations étaient combinées et ceci, quel que soit le type de jugement.

*Conclusion* : La démence a un impact sur les jugements moraux. Le jugement moral des personnes âgées atteintes de démence est dépendant de la tâche et de la condition.


*Mots clés :* démence, intégration de l'information, jugements moraux, personnes âgées

# Judgments of Blame and Forgiveness: A Comparison of Young Adults, Older Adults, and Older Adults with Dementia

Dementia is one of the main causes of disability and dependency among older adults worldwide. However, dementia is not a normal component of aging. According to the World Health Organization (2020), dementia is typically a chronic or progressive syndrome in which there is deterioration in cognitive function (i.e. the ability to process thought) beyond what might be expected from normal ageing. The deterioration affects memory, thinking, orientation, comprehension, calculation, learning capacity, language, and judgment (World Health Organization, 2020). Dementia may also affect the process of moral judgment (Fontaine et al., 2004).

Judgments of blame and forgiveness both refer to moral perspectives of the same painful reality (Telock, 2002). From a prosecutorial moral standpoint, the judgment of blame corresponds to an appropriate penalty for a harmful act. From a theological moral standpoint, the judgment of forgiveness corresponds to the level of sympathy with the offender. Judgments of blame and forgiveness belong to the moral algebra that constitutes the foundation of moral science, i.e. how people integrate information cues involved in actions (Anderson, 2019). Anderson (1996, 2008) postulated that any thought or action depends on the integration of different information cues. Furthermore, Anderson (1996, 2008) described a cognitive algebra, i.e. the use of simple cognitive rules to describe how individuals will combine information to make a global judgment. For example, the additive model assumes that an implicit moral judgment (blame or forgiveness) results from the addition (after weighting) of the scale values granted to the selected stimuli (e.g., Intent, Consequences, and Apologies). The multiplicative model assumes that the implicit moral judgment results from the multiplication of the scale values attached to these stimuli.

Anderson (2008, 2019) considered that the blame schema follows an additive rule:

blame = intent + consequences (e.g., Hermand, Mullet, Tomera, & Touzart, 2001; Przygotzki & Mullet, 1997; Wolf, 2001). Girard and Mullet (1997) considered that forgiveness also follows an additive rule: propensity to forgive = intent + cancellation of consequences + proximity [to the offender] + apologies. Other studies have provided support for the latter schema (e.g., Azar & Mullet, 2001; Azar, Mullet, & Vinsonneau, 1999; Girard, Mullet, & Callahan, 2002; Mullet & Girard, 2000). The blame and forgiveness schemas have some common components, and the rules used by young adults and older adults are similar (e.g., Przygotski & Mullet, 1997).

Researchers in the field of information integration have studied the effect of medical conditions on moral judgment processes. Notably, Rogé and Mullet (2011) examined moral judgments (of blame and forgiveness) among individuals with autism. They compared the ability of children, adolescents and adults with vs. without autism to (i) use information cues on intent and the severity of the consequences to blame an offender, and (ii) use information on intent and apology to infer willingness to forgive. In the blame task, people with autism were indeed able to use intent information but not to the same extent as people without autism did. In the forgiveness task, people with autism (regardless of age) never took intent into account. Rogé and Mullet's results showed that people with autism were able to use intent information for judging blame but did not take intent to forgive into account. Hence, the researchers suggested that people with autism's ability to use intent information was task-dependent. More recently, Moralez-Martinez, Lopez-Ramirez and Mullet (2015) examined moral judgments in people with Down's syndrome (DS). In particular, the researchers looked at how participants with DS and control participants mentally combined information about the intent of a harmful act and the severity of its consequences by assigning blame. People with DS were found to be able to make moral judgments in much the same way as control participants of the same age - even though they were not able to explain or justify their

judgments with sophisticated philosophical arguments. Fontaine, Salvano-Pardieu and Renoux (2004) studied the algebraic structure of blame patterns in 18 elderly adults with Alzheimer's disease and 18 healthy elderly adults. The researchers notably analysed the effects of intent, consequences, and the seriousness of the act on blame patterns. The two groups of participants did not differ in how they combined the intent and consequence of the act in their blame judgment. However, people with Alzheimer's disease were less able to take account of the seriousness of the act. These results confirmed the involvement of two different mechanisms in the judgment of blame.

In two studies, we compared the cognitive processes involved in judgments of blame and forgiveness by young adults, older adults, and older adults with dementia. The experimental paradigms were based on Anderson's theory of information integration (1996, 2008, 2019).

# Study 1

The objective of the first study was to complete Fontaine, Salvano-Pardieu and Renoux (2004)'s work by considering the cognitive processes involved in judgments of blame and forgiveness by adults with dementia. It transposed the issue of blame judgment in individuals with dementia to the blame schema derived from intent and consequences (e.g., Wolf, 2001). We also considered judgments of forgiveness. To this end, we compared the cognitive processes or rules (i.e. ways of cognitively integrating information cues) involved in judgments of blame and forgiveness in a "vulnerable" population (older adults with dementia) *vs.* two healthy control populations (young adults, and older adults).

Our first hypothesis was that young adults, older adults, and older adults with dementia would combine intent and consequence information cues in the same manner in both blame and forgiveness judgments (Fontaine et al., 2004). Our second hypothesis was that the ability of adults with dementia to use intent and consequence information cues would differ

for judgments of blame vs. judgments of forgiveness, i.e. in a task-dependent way (Rogé & Mullet, 2011).

## Methods

### Participants

Three groups of participants (all recruited from the city of Calais, in northern France) were included in the study. The first group consisted of 40 older adults with dementia ($M_{age}$ = 78.54, $SD$ = 10.63) living in the "La Roselière" residential home for dependent elderly people (operated by Calais General Hospital). The main study inclusion criterion was geriatrician-diagnosed dementia. The main exclusion criteria were severe visual or auditory impairments, major depression (as determined by the residential home's physician) and/or severe behavioural disorders. The second group consisted of 40 community-dwelling older adults ($M_{age}$ = 65.07, $SD$ = 10.73) recruited in the street. The third population consisted of 34 young adults ($M_{age}$ = 21.08, $SD$ = 3.62) recruited at a university in Calais. None of the participants received remuneration. All participants were given comprehensive information on the study's objectives and procedures and gave their written consent to participation. Verbal assent was collected if an elderly person with dementia was unable to given written consent but was able to understand the nature of the study. In such a case, a parent or a legal guardian gave their written consent to participation of the elderly person with dementia. Lastly, the investigator and the participant (or the parent or legal guardian) arranged where and when to perform the experiment.

### Material

The study material comprised two questionnaires, each of which contained six scenarios. The first questionnaire concerned blame (Task 1), and the second concerned forgiveness (Task 2). Each scenario contained a hypothetical story, a question, and a response scale. The scenarios described an everyday situation that was familiar to elderly people and

could be very easily understood by all participants: help with showering at home provided by Julie, a nurse. During the shower, the elderly person ("Fred") falls. Pictograms were used to make the scenario easier to read and understand (as previously described by Morales-Martinez et al., 2015). In all the scenarios, a transgression was committed. The transgression was sometimes accidental and sometimes deliberate (intentional), and the consequences differed in the degree of seriousness (no consequences; moderate consequences, i.e., the elderly person requires a walking aid after the fall; or severe consequences, i.e. the elderly person will never be able to walk again). The orthogonal combination of these two factors resulted in six scenarios.

In the blame task (questionnaire 1), the question "In your opinion, what level of blame does Julie deserve?" was presented beneath each scenario, and was followed by a 20 cm response scale ranging from "No blame at all" at the left anchor and the "A very high level of blame" at the right anchor.

In the forgiveness task (questionnaire 2), the question was "If you were Fred, would you forgive Julie?", and the 20 cm response scale ranged from "I am absolutely sure I would not forgive her" at the left anchor and the "I am absolutely sure I would forgive her" at the right anchor. An example of a blame scenario and an example of a forgiveness scenario are given in the Appendix.

**Procedure**

The study was approved by the Research Ethics Committee of Federal Toulouse Midi-Pyrénées University (France), and by the director of the residential home. All participants responded individually. Half of the participants were presented with the blame scenarios and then the forgiveness scenarios, and the other half were presented with the same scenarios but in the opposite order. The investigator explained what was expected of each participant. In the first (familiarization) phase of the study, the participant was invited to read three short stories

in which the water went cold while a nurse was helping an older adult to have a shower. Each story had a different level of intent by the nurse, and a different level of consequence. The investigator checked that the participants had understood the story and the pictograms. Each story was read aloud by the participant, and he/she could read and re-read the stories as many times as he/she wished before making a judgment. During this phase, the participant was allowed to compare his/her answers for the three stories. In the second (experimental) phase, the six stories were presented in random order. The participant read each story out loud twice. To help the participant to recall the details of each story, he/she could refer to the text and the associated pictograms until he/she was ready to make a judgment. The judgment was made by marking a position (using a pen) on the response scale. Each participant was allowed to make judgments at his/her own pace; no time limit was imposed. In contrast to the familiarization phase, however, the participant was not allowed to refer to or change previous answers.

**Data analysis**

The participant's ratings on the response scale were converted into a numerical value by measuring the distance between the left anchor (the origin) and the mark. The distance data were then processed in graphical and statistical analyses. Data from the familiarization phase were not processed. In each task (blame or forgiveness), we performed an analysis of variance (ANOVA) with repeated measures. To test the first hypothesis (i.e. that young adults, older adults, and older adults with dementia would combine intent and consequence information cues in the same manner in both blame and forgiveness judgments (Fontaine et al., 2004)), an ANOVA with a 2 x 3 x 3 design (Intent x Consequence x Group (young adults, older adults, older adults with dementia)) was applied to each task. To test the second hypothesis (i.e. that the ability of adults with dementia to use intent and consequence information cues would differ for judgments of blame vs. judgments of forgiveness (Rogé & Mullet, 2011)), an ANOVA with a 2 x 3 design (Intent x Consequence) was applied to each group and each task.

## Results

### Task 1: Judgment of blame

In the first (2 x 3 x 3) ANOVA, the Intent factor had a significant effect ($F(1,111) = 279.42$, $p < .001$, $\eta^2_p = .72$), as did the Consequence factor ($F(2,222) = 17.81$, $p < .001$, $\eta^2_p = .14$) and the Group factor ($F(2,111) = 4.66$, $p < .011$, $\eta^2_p = .08$). For the Group factor, Tukey's test did not indicate significant differences between young adults and older adults (p = .254) or between older adults and older adults with dementia (p =.284). Nevertheless, the difference between young adults and older adults with dementia was significant (p <.008 in Tukey's test). Furthermore, the Intent x Consequence x Group interaction was significant ($F(4,222) = 2.84$, $p < .011$, $\eta^2_p = .05$). The three groups differed in their manner to combine Intent and Consequence factors.

The results of the second (2 x 3) ANOVA are summarized in Table 1. The effect of intent and the effect of consequence were significant in the two healthy groups. The effect size was larger for Intent ($\eta^2_p = .64$ and .92 in young adults and older adults, respectively) than for Consequence. The Intent x Consequence interaction was not significant in young adults (p =.649) or older adults (p =.248). In contrast, this interaction was significant in older adults with dementia (p <.042).

*Insert Table 1*

The full results for the six blame scenarios in the three groups of participants are shown in Figure 1. In each panel, the three levels of the Consequence factor are given on the horizontal axis, and the degree of blame is given on the vertical axis. The two curves correspond to the two levels of the Intent factor (accidental or deliberate).

*Insert Figure 1*

In young adults (Figure 1, left panel) and in older adults (Figure 1, middle panel), the two curves are clearly separate - indicating a marked effect of the Intent factor. The two

curves rose from left to right: the more severe the consequence, the more the participants were willing to blame the nurse. Lastly, the two curves are approximately parallel, indicating that an additive integration rule had been applied.

In older adults with dementia (Figure 1, right panel), the fact that the two curves rose from left to right again indicates an effect of consequence. The curves are closer together than those of the young adults and older adults; this indicates an effect of intent in older adults with dementia, albeit to a lesser extent than in the two other groups. The fact that the curves are not parallel suggests that an interactive integration rule has been applied.

**Task 2: Judgment of forgiveness**

In the first (2 x 3 x 3) ANOVA, the Intent factor had a significant effect ($F(1,111) = 186.42$, $p < .001$, $\eta^2_p = .63$), as did the Consequence factor ($F(2,222) = 29.17$, $p < .001$, $\eta^2_p = .21$). However, the Group factor ($F(2,111) = 1.46$, $p = .237$, $\eta^2_p = .03$) and the Intent x Consequence x Group interaction ($F(4,222) = 2.09$, $p = .083$, $\eta^2_p = .03$) were not statistically significant. There was no difference between the three groups in their manner to combine Intent and Consequence factors.

The results of the 2 x 3 ANOVA are summarized in Table 2. The effects of intent and consequence were significant in the two healthy groups. The effect size was larger for Intent ($\eta^2_p = .76$ and .62 in young adults and older adults, respectively) than for Consequence. In older adults with dementia, the effect of intent was significant but the effect of consequence was not (p = .167). The Intent x Consequence interaction was not significant in any of the three groups.

*Insert Table 2*

The full results for the six forgiveness scenarios in the three groups of participants are shown in Figure 2. In all three graphs, the two curves are clearly separate - indicating that the lower the degree of intent, the more willing the participants were to forgive the nurse. For the

young adults (Figure 2, left panel) and older adults (Figure 2, middle panel), the curves fell from left to right - suggesting that the less severe the consequences, the more the participants were willing to forgive the nurse. In each graph, the two curves are parallel – suggesting that an additive integration rule had been applied. In older adults with dementia (Figure 2, right panel), the curves are flatter; this indicates that this group took less account of the scenario's consequences.

*Insert Figure 2*

## Discussion

The objective of study 1 was to assess the impact of dementia on judgments of blame and forgiveness. We compared the cognitive processes and rules involved in these moral judgments in a vulnerable population and two healthy populations. Our first hypothesis was that young adults, older adults, and older adults with dementia would combine intent and consequence information cues in the same manner when judging blame and judging forgiveness (Fontaine et al., 2004). This hypothesis was not supported by the study data.

In the blame task, all participants used intent and consequence information cues to judge the degree of blame. This finding is consistent with the literature data (Anderson, 2008, 2019; Hermand et al., 2001; Przygotzki & Mullet, 1997; Wolf, 2001). Each of the three groups of participants gave more weight to intent; again, this is in line with previous studies (Przygotzki & Mullet, 1997). In Fontaine et al.'s (2004) analysis of the effects of intent and consequences of the action on the propensity to apportion blame, there were no significant differences in algebraic structure between a group of patients with Alzheimer's disease and a control group; the two groups combined information about intent and consequence in the same way. Our results confirmed that there was no difference in judgments between older adults with dementia and those without. Furthermore, our results confirmed Przygotski and Mullet's (1997) findings; there was no difference in judgment between young adults and older

adults. Young adults and older adults used an additive rule to integrate intent and consequence. However, our results highlighted a difference in judgment between young adults and older adults with dementia. Older adults with dementia used Intent and Consequence factors but attributed significantly less weight to the Consequence factor when judging blame. The level of blame was primarily judged by considering intent: the more intentional the act, the more blameworthy it was.

In the forgiveness task, the young adults and the older adults also used information about intent and consequence to judge the level of forgiveness. Both groups used an additive rule to integrate the information. This is consistent with a report by Girard and Mullet (1997) in which young adults and older adults used an additive rule to integrate intention and consequence. In contrast, consequence did not have an effect on judgment by older adults with dementia; in the forgiveness task, only intent information was taken into account by this group.

Our present findings show that the older adults with dementia did not combine intent and consequence in the same way as young adults. Our results reinforce Fontaine et al.'s (2004) findings; we confirmed that the cognitive processes involved in moral judgments are different in older adults with dementia vs. young adults. One possible explanation for this difference relates to the impairments in cognitive function associated with illness. Dementia is considered to be a major neurocognitive disorder in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (American Psychiatric Association, 2013) and is characterized by cognitive decline that compromises the individual's independence. Although consciousness is not affected, this cognitive decline can affect memory, reasoning, calculation, learning ability, and judgment (Vanmeter & Hubert, 2014).

Our second hypothesis was that the ability of adults with dementia to use information on intent and consequence would be task-dependent (Rogé & Mullet, 2011). The study results

supported this hypothesis. With regard to the structure of blame and forgiveness patterns, the older adults with dementia differed in how they combined the intent and the consequence of the act. In judgments of blame, the older adults with dementia used both intent and consequence and applied an interactive integration rule. In judgments of forgiveness, the group used the information cues on intent but not those on consequence. This is in line with Rogé and Mullet's (2011) study in which the ability to use intent information by people with autism was strongly task-dependent. Our results show that the use of information on intent and consequence by older adults with dementia depends on the type of moral judgment. From a prosecutorial moral standpoint (e.g., in the context of blame), older adults with dementia appear to be capable of using information cues on intent and consequence. From a theological moral perspective (e.g., in the context of forgiveness), older adults with dementia might only use intent to judge a transgressive act.

The results of study 1 highlighted the impact of dementia on a concomitant examination of blame and forgiveness. However, the study had a limitation: the scenarios were simple and combined only two factors. This was a deliberate choice, so that the scenario would be easier to understand and judge by people with dementia. In fact, blame and forgiveness schemas are often complex (e.g., Anderson, 2019), and it is not clear whether people with dementia would be able to combine three, four or five factors in their judgment-making (e.g., Girard & Mullet, 1997; Przygotzki & Mullet, 1997). Hence, we performed a second study with a greater number of factors.

# Study 2

Study 2 was also based on Anderson's theory of information integration (1996, 2008). We compared the cognitive processes involved in blame and forgiveness judgments of young adults, older adults, and older adults with dementia. Study 2 extended study 1 in several ways. In the study 1, the scenarios were simple and combined two factors only. However, other

factors (such as apology, proximity, and negligence) may be considered when investigating moral judgment (Anderson, 2008, 2019).

Hence, the objective of study 2 was to test the number of factors that older adults with dementia were able to integrate during moral judgments (Fontaine et al., 2004; Mullet et al., 2007. What happens when older adults with dementia are confronted with more than two factors? Our main hypothesis was that differences between healthy adults and older adults with dementia should appear (as a results of cognitive decline in the latter) when the participants had to considered scenarios with three, four or five independent factors (see Vanmeter & Hubert, 2014, for example).

## Method

### Participants

All the participants in study 1 participated in study 2.

### Material

Three sets of two questionnaires (a blame task and a forgiveness task) corresponding to three conditions were used to describe a familiar situation in daily life that all elderly and young people could understand very easily. In the three conditions, Julie (a nurse) helps Alain (an elderly person) to shower at home. During the shower, Alain falls over. Each scenario contained three information cues: (a) the nurse's degree of intent (with or without intent), (b) the severity of the consequences for the older adult (no sequelae; use of a walking aid; inability to walk ever again), and (c) the caregiver's willingness to apologize (apologetic or not apologetic). The orthogonal combination of these three factors resulted in 2 x 3 x 2 = 12 scenarios. Pictograms like those in study 1 were used to make the scenarios easier to read and understand (e.g., Morales-Martinez et al., 2015). In the blame task, the judgment corresponded to the answer to the question "In your opinion, what level of blame does Julie deserve?". A 20 cm response scale ranging from "No blame at all" at the left anchor and the

"A very high level of blame" at the right anchor was placed under each story. In the forgiveness task, the judgment corresponded to the answer to the question "If you were Fred, would you forgive Julie?"; the 20 cm response scale ranged from the "I am absolutely sure I would not forgive her" at the left anchor and the "I am absolutely sure I would forgive her" at the right anchor.

Two other conditions were applied: one with four factors (Intent x Negligence x Consequences x Apologies), and one with five factors (Proximity x Intent x Negligence x Consequences x Apologies) combined. The degree of negligence (negligent or not) and the degree of proximity (close or not) were added. The orthogonal combination of the four factors resulted in 2 x 2 x 3 x 2 = 24 scenarios in the second condition. The orthogonal combination of the five factors resulted in 2 x 2 x 2 x 3 x 2 = 48 scenarios in the third condition. Judgments of blame and forgiveness were recorded in the same way in each condition.

**Procedure**

The study was approved by the Research Ethics Committee of Federal Toulouse Midi-Pyrénées University (France), and by the director of the residential home. As advocated by Anderson, a pilot feasibility study of 10 participants with dementia was performed first. The pilot study's results confirmed that older adults with dementia were able to understand the everyday scenarios in the questionnaires and were able to rate their judgments on the answer scale. As in study 1, all the participants were informed about the study's objectives and methods and were told that they could withdraw from the study at any time. In line with Anderson's methodology (1996), the overall procedure for study 2 was the same as for study 1, with familiarization and experimental phases. Three separate experimental sessions (one per week, corresponding to the three conditions) were organized.

**Data analysis**

As in study 1, two separate repeated-measures ANOVAs were applied for each task (blame and forgiveness) and each condition. The first ANOVAs had the group membership as a between-subject variable, the factors as independent variables, and the judgment as dependent variable. The second ANOVAs were performed on each group.

In condition 1, the first ANOVA was performed with a three-factor (Intent x Consequence x Apologies) x Group (young adults, old adults, old adults with dementia) design, i.e. 2 x 3 x 2 x 3. The second ANOVA had a 2 x 3 x 2 design (Intent x Consequence x Apologies) in each group.

In condition 2, the first ANOVA was performed with a four-factor (Intent x Negligence x Consequence x Apologies) x Group design, i.e. 2 x 2 x 3 x 2 x 3. The second ANOVA had a 2 x 2 x 3 x 2 design (Intent x Negligence x Consequence x Apologies) in each group.

In condition 3, the first ANOVA was performed with a five-factor (Proximity x Intent x Negligence x Consequence x Apologies) x Group design, i.e. 2 x 2 x 2 x 3 x 2 x 3. The second ANOVA had a 2 x 2 x 2 x 3 x 2 design (Proximity x Intent x Negligence x Consequence x Apologies) in each group.

## Results

### Task 1: Judgment of blame

#### *First condition: the three-factor questionnaire*

ANOVAs were performed on all three groups of participants. In the first (2 x 3 x 2 x 3) ANOVA, the Intent factor had a significant effect ($F(1,111) = 274.83$, $p < .000$, $\eta^2_p = .71$), as did the Consequence factor ($F(2,222) = 21.29$, $p < .000$, $\eta^2_p = .16$), the Apologies factor ($F(1,111) = 43.31$, $p < .000$, $\eta^2_p = .28$) and the Group factor ($F(2,111) = 3.60$, $p < .03$, $\eta^2_p = .06$). For the Group factor, Tukey's test did not reveal significant differences between young adults and older adults (p = .940) or between older adults and adults with dementia (p=.080).

Nevertheless, the difference between young adults and older adults with dementia was significant ($p < .044$ in Tukey's test).

The results of the 2 x 3 x 2 ANOVAs (Intent x Consequence x Apologies) are presented in Table 3. In young adults and older adults, the effects of Intent, Consequence, and Apologies were significant. In older adults with dementia, the effects of Intent and Apologies were significant.

Figure 3 shows the combined effect of Intention, Consequence, and Apologies on judgments of blame in the three groups of participants. In each panel, the three levels of the Consequence factor are given on the horizontal axis, and the degree of blame is given on the vertical axis. The two curves correspond to the two levels of the Intent factor (accidental or deliberate). Each pattern corresponds to one level of the Apologies factor (apologetic or not). The mean ratings of judgments of blame are on the y-axis.

*Insert Figure 3*

In each panel, the two curves are clearly separate - indicating a marked effect of the Intent factor. The effect size of the factor Intent is the strongest ($\eta^2_p = .77$ in young adults and $\eta^2_p = .86$ in older adults and $\eta^2_p = .42$ in older adults with dementia): the greater the intent, the more the participants were willing to blame the nurse.

In young adults (Figure 3, top panel) and older adults (Figure 3, middle panel), the two curves rise from left to right: the more severe the consequence, the more the participants were willing to blame the nurse. The two curves are approximately parallel, indicating that an additive integration rule had been applied.

In older adults with dementia (Figure 3, bottom panel), the two curves are separate but closer together than those in the young adults and older adults: the stronger the intention, the more the nurse was blamed. The two curves are approximately parallel to the x-axis, with confirms that the consequence did not have a significant effect.

***The second condition: the four-factor questionnaire***

In the first (2 x 2 x 3 x 2 x 3) ANOVA, each factor had a significant effect. The Intent factor ($F(1,111) = 209.09$, $p < .000$, $\eta^2_p = .65$), the Negligence factor ($F(1,111) = 96.95$, $p < .000$, $\eta^2_p = .46$), the Consequences factor ($F(2,222) = 24.46$, $p < .000$, $\eta^2_p = .18$), the Apologies factor ($F(1,111) = 36.27$, $p < .000$, $\eta^2_p = .24$) and the Group factor ($F(2,111) = 6.61$, $p < .001$, $\eta^2_p = .10$) had a significant effect. For the Group factor, Tukey's test did not reveal significant differences between young adults and older adults (p = .304) or between young adults and older adults with dementia (p=.118). However, the difference between healthy older adults and older adults with dementia was significant (p <.001).

The results of the second ANOVA (with a 2 x 2 x 3 x 2 design: Intent x Negligence x Consequences x Apologies) are presented in Table 3. In young adults and healthy older adults, the effects of Intent, Negligence, Consequences, and Apologies were significant. In older adults with dementia, only the effects of Intent and Negligence were significant.

***The third condition: the five-factor questionnaire***

In the first (2 x 2 x 2 x 3 x 2 x 3) ANOVA, the Proximity factor did not have a significant effect ($F(1,111) = 1,33$, $p = .25$, $\eta^2_p = .01$). The Intent factor had a significant effect ($F(1,111) = 130.62$, $p < .000$, $\eta^2_p = .54$), as did the Negligence factor ($F(1,111) = 65.33$, $p < .000$, $\eta^2_p = .37$), the Consequences factor ($F(2,222) = 34.86$, p <.000, $\eta^2_p = .23$), the Apologies factor ($F(1,111) = 29.55$, $p < .000$, $\eta^2_p = .21$) and the Group factor ($F(2,111) = 7.31$, $p < .001$, $\eta^2_p = .11$). For the Group factor, Tukey's test did not reveal significant differences between young adults and older adults with dementia (p = .588). However, the differences between young adults and older adults (p <.030) and between healthy older adults and older adults with dementia (p <.001) were significant.

The results of the second ANOVA performed on each group with a 2 x 2 x 2 x 3 x 2 design (Proximity x Intent x Negligence x Consequences x Apologies) are presented in Table

3. In young adults, the effects of Intent, Consequences, Apologies, Negligence, and Proximity were significant. In older adults, the effects of Intent, Consequences, Apologies, and Negligence, and Proximity were significant. In older adults with dementia, only the effect of Intent was significant.

**Task 2: Judgment of forgiveness**

***The first condition: the three-factor questionnaire***

In the first (2 x 3 x 2 x 3) ANOVA, the Intent factor had a significant effect ($F(1,111) = 106.34$, $p < .000$, $\eta^2_p = .48$) , as did the Consequence factor ($F(2,222) = 40.95$, $p < .000$, $\eta^2_p = .26$), and the Apologies factor ($F(1,111) = 67.12$, $p < .000$, $\eta^2_p = .37$). The Group factor ($F(2,111) = 2.75$, $p < .06$, $\eta^2_p = .04$) was not significant.

The results of the second 2 x 3 x 2 ANOVA (Intent x Consequence x Apologies) performed on each group are presented in Table 4. In young adults and older adults, the effects of Intent, Consequence, and Apologies were significant. In older adults with dementia, the effects of Intent and Apologies were significant.

Figure 4 shows the combined effect of Intention, Consequence, and Apologies on judgments of forgiveness in the three groups of participants. In each panel, the three levels of the Consequence factor are given on the horizontal axis, and the degree of blame is given on the vertical axis. The two curves correspond to the two levels of the Intent factor (accidental or deliberate). Each pattern corresponds to one level of the Apologies factor (apologetic or not). The mean ratings of judgments of forgiveness are on the y-axis.

*Insert Figure 4*

In all the panels, the two curves are clearly separate - indicating that the lower the degree of intent, the more the participants were willing to forgive. For the young adults (Figure 4, top panel) and older adults (Figure 4, middle panel), the curves fell from left to right - indicating that the less severe the consequences, the more the participants were willing

to forgive. In each graph, the two curves are parallel, which suggests that an additive integration rule had been applied. In all cases, the left graph is above the right graph on the y-axis. This indicates the effect of the Apologies factor: the less apologetic the nurse, the lower the degree of forgiveness.

In contrast, the curves for the older adults with dementia (Figure 4, bottom panel) are separate, flat, and parallel to the x-axis. This indicates that the older adults with dementia took account of the Intent factor: the greater the intent, the lower the degree of forgiveness. In the pair of patterns, each left graph is above the right graph on the y-axis. This again indicates the effect of the apologies factor: the less apologetic the nurse, the lower the degree of forgiveness.

***The second condition: the four-factor questionnaire***

In the first (2 x 2 x 3 x 2 x 3) ANOVA, the Intent factor ($F(1,111) = 105.85$, $p < .000$, $\eta^2_p = .49$), the Negligence factor ($F(1,111) = 48.25$, $p < .000$, $\eta^2_p = .30$), the Consequence factor ($F(2,222) = 56.44$, $p < .000$, $\eta^2_p = .33$), the Apologies factor ($F(1,111) = 44.85$, $p < .000$, $\eta^2_p = .28$) and the Group factor ($F(2,111) = 12.15$, $p < .000$, $\eta^2_p = .18$) all had a significant effect. For the Group factor, Tukey's test did not reveal a significant difference between young adults and older adults ($p = .606$). However, the differences between young adults and older adults with dementia ($p < .001$) and between healthy older adults and older adults with dementia ($p < .001$) were significant.

The results of the second (2 x 2 x 3 x 2: Intent x Negligence x Consequence x Apologies) ANOVA performed on each group are presented in Table 4. In young adults and older adults, the effects of Intent, Negligence, Consequence, and Apologies were significant. In older adults with dementia, the effects of Intent and Negligence were significant.

***The third condition: the five-factor questionnaire***

In the first ANOVA (with a 2 x 2 x 2 x 3 x 2 x 3 design), the Intent factor had a significant effect ($F(1,111) = 88.57$, $p < .000$, $\eta^2_p = .44$), as did the Negligence factor ($F(1,111) = 39.78$, $p < .000$, $\eta^2_p = .26$), the Consequences factor ($F(2,222) = 65.20$, $p < .000$, $\eta^2_p = .37$), the Apologies factor ($F(1,111) = 51.71$, $p < .000$, $\eta^2_p = .31$), the Proximity factor ($F(2,111) = 7.31$, $p < .001$, $\eta^2_p = .11$), and the Group factor ($F(1,111) = 16,28$, $p < .00$, $\eta^2_p = .22$). For the Group factor, Tukey's test did not reveal a significant difference between young adults and older adults ($p = .267$). However, the differences between young adults and older adults with dementia ($p < .001$) and between healthy older adults and older adults with dementia ($p < .001$) were significant.

The results of the second 2 x 2 x 2 x 3 x 2 ANOVA (Proximity x Intent x Negligence x Consequences x Apologies) performed on each group are presented in Table 4. In young adults and older adults, the effects of Intent, Consequences, Apologies, Negligence, and Proximity were significant. In older adults with dementia, only the effect of Intent was significant.

## Discussion

The purpose of the second study was to test the number of factors that older adults with dementia are able to integrate in judgments of blame and forgiveness (Fontaine et al., 2004; Mullet et al., 2007). In view of the cognitive decline observed in people with dementia (Vanmeter & Hubert, 2014), we supposed that differences between the healthy adults and the older adults with dementia would appear when the latter were confronted with scenarios containing three, four or five independent factors. We hypothesized that as the number of factors rose, the less older adults with dementia would be able to combine them. Indeed, our results confirmed this hypothesis.

There were differences between healthy adults and older adults with dementia in the number of factors taken in account in three-, four- and five-factor scenarios. In the majority of

conditions, healthy adults took account of all the factors when judging blame or forgiveness. In contrast, older adults with dementia were able to consider only two factors when the scenario comprised three or four factors. Furthermore, these two factors differed according to the condition and the task. Intent and Apologies were considered when scenarios were composed of three factors (condition 1), regardless of whether blame or forgiveness was being judged. Intent and Negligence were considered when scenarios were composed of four factors (condition 2) and blame was being judged (task 1). Intent and Consequence were considered when scenarios were composed of four factors (condition 2) and forgiveness was being judged (task 2).

The results of study 2 confirmed those of study 1. Older adults with dementia were able to combine at most two factors specially to blame. According to the task, older adults with dementia did not take into account the same two factors. As in the study 1, the moral judgment among older adults with dementia is task-dependant. The results of study 2 also extended those of study 1: older adults with dementia were not able to integrate more than two factors when they were confronted with three, four or five. Furthermore, the way that older adults with dementia took account of these two factors depended on the condition. Moral judgment among older adults with dementia is condition-dependant.

Whatever the task and the condition, older adults with dementia gave greater weight to the intent factor. In both tasks, intent was the only factor taken into consideration when scenarios were composed of five factors (condition 3). These findings showed that intent is an invariant factor for moral judgments of blame and forgiveness by older adults with dementia.

## General discussion

The main objective of the two studies described here was to compare the cognitive processes involved in blame and forgiveness judgments by young adults, older adults, and older adults with dementia.

Study 1 extended Fontaine et al. (2004)'s study. It assessed the impact of dementia on judgments of blame and forgiveness when the Intention and Consequence factors were combined. The main finding was that both Intent and Consequence were taken into account by older adults with dementia when judging blame. Nevertheless, older adults with dementia attributed significantly less weight to the Consequence factor: the more intentional the act, the more blameworthy it was judged to be. In contrast, older adults with dementia only took account of intent information in the forgiveness condition. The moral judgment among older adults with dementia is task-dependant.

The results of study 2 confirmed the impact of dementia on moral judgments of blame and forgiveness in the same population as in study 1. Healthy older adults and older adults with dementia were able to take account of least two factors, depending on the task.

Moreover, study 2 tested the number of factors that older adults with dementia were able to integrate during these moral judgments (Fontaine et al., 2004; Mullet et al., 2007). Unlike healthy older adults, older adults with dementia had difficulty in considering more than two factors and integrating as much information. As a result of cognitive decline (Vanmeter & Hubert, 2014), older adults with dementia did not use all the available information (three, four or five cues) to make their judgment and they primarily considered the intent of the act. Among older adults with dementia, moral judgment is not only task-dependant but also condition-dependant, and intent is an invariant factor.

**Limitations and Practical Applications**

Our work had several limitations. Firstly, we did not distinguish between different clinical types of dementia, and so we could not determine whether dementia is always associated with the same judgment pattern. Secondly, the mean age of the group of older adults with dementia is significantly higher than that of the older adults without dementia (78.54 years vs 65.07 years). Such a significant difference in ages (more than 13 years)

among older people naturally may lead to remarkable differences in their cognitive functioning, regardless of presence of dementia (Letenneur et al., 1994). Thirdly, we did not distinguish between stages of dementia (e.g., Fontaine et al., 2004). Indeed, cognitive patterns might change as the disease progresses. Fourthly, other types of theological moral judgment (e.g., resentment and reconciliation) and prosecutorial moral judgement (e.g., prosecution and revenge) could have been considered (Mullet, Riviere & Muñoz Sastre, 2007). Our future investigations will focus on circumventing these limitations.

Life expectancy is increasing as a result of advances in medical science and the availability of better healthcare services; the proportion of elderly people in the general population is therefore rising. Given the risk of dementia rises with age, the number of persons with dementia in the general population is also increasing. Dementia is a set of behaviours or symptoms that suggest impairments in cognitive function (Sujata & Davidson, 2014). It is thought that all degenerative disorders begin insidiously and progress gradually. Cognitive stimulation (i.e. group activities that are intended to provide cognitive training and improve social functioning) might optimize specific cognitive functions (Simon et al., 2012). Hence, studies of moral judgement might help to detect the symptoms of early-stage dementia and thus facilitate secondary prevention.

***Appendix***

*An example of a scenario in the task of blame judgment (Intent × Consequence)*

Julie is a nurse  . She comes to help wash Fred  , an 85-year-old person living alone at home  .

During the shower  , Julie gets very annoyed  by Fred's lack of cooperation, and she turns the tap so that the water becomes very, very cold  . Fred is surprised, moves

back, loses his balance, and falls over 

.

After his fall, Fred goes to hospital and is examined by a doctor  . Everything is fine, Fred has not broken any bones, and his fall will not have any consequences  . Fred goes home on the same day  .

"In your opinion, what level of blame does Julie deserve?"

No blame at all ---------- A very high level of blame

*The same scenario in the task of forgiveness judgment (Intent X Consequence)*

Julie is a nurse  . She comes to help wash Fred  , an 85-year-old person living alone at home  .

During the shower  , Julie gets very annoyed  by Fred's lack of cooperation, and she turns the tap so that the water becomes very, very cold  . Fred is surprised, moves back, loses his balance, and falls over 

.

After his fall, Fred goes to hospital and is examined by a doctor  . Everything is fine, Fred has not broken any bones, and his fall will not have any consequences  . Fred

goes home on the same day  .

"If you were Fred, would you forgive Julie for your fall?"

Absolutely sure ---------- Absolutely sure

that I would not forgive her that I would forgive her

## References

American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders*. Arlington, VA. https://doi.org/10.1176/appi.books.9780890425596

Anderson, N. H. (1991). Moral-Social development. In N. H. Anderson (Ed.), *Contributions to information integration theory, 3,* 137-187. Hillsdale, NJ: Erlbaum.

Anderson, N. H. (1996). *A Functional Theory of Cognition*. Hillsdale: Lawrence Erlbaum.

Anderson, N. H. (2008). *Unified Social Cognition*. New York, NY: Psychology Press.

Anderson, N. H. (2019). *Moral Science*. Taylor & Francis Ltd.

Azar, F., Mullet, E., & Vinsonneau, G. (1999). The propensity to forgive: Findings from Lebanon. *Journal of Peace research, 36,* 169-181. https://doi.org/10.1177/0022343399036002003

Azar, F., & Mullet, E. (2001). Interpersonal forgiveness among Lebanese: A six confession study. *International Journal of Group Tensions*, *30*, 161-181. https://doi.org/10.1023/A:1005204408575

Fontaine, R., Salvano-Pardieu, V., Renoux, P. & Pulford, B.D. (2004). Judgment of blame in Alzheimer's disease sufferers. *Aging, Neuropsychology, and Cognition*, *11*(4), 379-394. . https://doi.org/10.1080/13825580490521313

Girard, M., & Mullet, E. (1997). Forgiveness in adolescents, young, middle-aged, and older adults. *Journal of Adult Development, 4,* 209-220. https://doi.org/10.1007/BF02511412

Girard, M., Mullet, E., & Callahan, S. (2002). Mathematics of forgiveness. *American Journal of Psychology*, *115*, 351-375. https://doi.org/10.2307/1423422

Grueneich, R. (1982). The development of children's integration rules for making moral judgments. *Child Development, 53,* 887-894. https://doi.org/10.2307/1129125

Hermand, D., Mullet, E., Tomera, P., & Touzart, V. (2001). The relationship between intent, consequences, the dangerousness of the victim, and blame: The case of self-defense. *Psychology, Crime & Law, 7,* 57-69. . https://doi.org/10.1080/10683160108401783

Hommers, W., & Anderson, N. H. (1985). Recompense as a factor in assigned punishment. *British Journal of Developmental Psychology, 3,* 75-86. . https://doi.org/10.1111/j.2044835X.1985.tb00957.x

Hommers, W., & Anderson, N. H. (1988). Algebric schemes in legal thought and in everyday morality. In H. Wegener, F. Lösel, & J. Haisch (Eds.), *Criminal behavior and the justice system.* New York: Springer-Verlag.

Hommers, W., & Anderson, N. H. (1991). Moral algebra of harm and recompense. In N. H. Anderson (Ed.), *Contributions to information integration theory* (Vol. 2, pp. 101-141). Hillsdale, NJ: Erlbaum.

Leon, M. (1980). Integration of intent and consequences information in children's moral judgments. In F. Wilkening, J. Becker, & T. Trabasso (Eds.), *The integration of information by children.* Hillsdale, NJ: Erlbaum.

Leon, M. (1982). Rules in children's moral judgments; integration of intent, damage, and rationale information. *Developmental Psychology, 18,* 835-842. https://doi.org/10.1037/0012-1649.18.6.835

Leon, M. (1984). Rules mothers and sons use to integrate intent and damage information in their moral judgments. *Child Development, 55,* 2106-2113. https://doi.org/10.2307/1129783

Letenneur, L., Commenges, D., Dartigues, J.F., & Barberger-Gateau, P. (1994). Incidence of dementia and Alzheimer's disease in elderly community residents of south-western France. *International Journal of Epidemiology*. 23(*6*), 1256-61. https://doi: 10.1093/ije/23.6.1256

Morales, G. E., Lopez, E. O., & Mullet, E. (2015). Blame judgements among people with Down syndrome. *Journal of Intellectual and Developmental Disability*, https://doi.org/10.3109/13668250.2015.1093104

Mullet, E., & Girard, M. (2000). Developmental and cognitive points of view on forgiveness. In M. McCullough, K. Pargament, & C. Thoresen (Eds.), *Forgiveness: Theory, research and practice,* 111-132. New York: Guilford.

Mullet, E., Rivière, S., & Muñoz Sastre, M. T. (2007). Cognitive processes involved in blame and blame-like judgments and in forgiveness and forgiveness-like judgments. *American Journal of Psychology*, *120*(1), 25-46.

Przygotzki, N., & Mullet, E. (1997). Moral judgment and aging. *European Review of Applied Psychology, 47,* 15-21. https://doi.org/10.1023/B:JADE.0000044532.83720.74

Rogé, B., & Mullet, E. (2011). Blame and forgiveness judgments among children, adolescents and adults with autism. *Autism*, *15*(6), 702-712. https://doi.org/10.1177/1362361310394219

Simon, S. S., Yokomizo, J. E., Bottino, C. M. (2012). Cognitive intervention in amnestic Mild Cognitive Impairment: A systematic review. *Neuroscience and Biobehavioral Reviews*, *36*(4), 1163-1178. https://doi.org/10.1016/j.neubiorev.2012.01.007

Sujata, R., and Davidson, S. (2014). Dementia and Cognitive Decline: a Review of the evidence. *Age UK Research.* https://doi.org/10.1371/journal.pmed.1000316

Surber, C. F. (1977). Developmental processes in social inference: Averaging of intentions and consequences in moral judgment. *Developmental Psychology, 13,* 654-665. . https://doi.org/10.1037/0012-1649.13.6.654

Surber, C. F. (1982). Separable effects of motives, consequences, and presentation order on children's moral judgments. *Developmental Psychology, 18,* 257-266. . https://doi.org/10.1037/0012-1649.18.2.257

Tetlock, P. E. (2002). Social functionalist frameworks for judgment and choice: Intuitive politicians, theologians, and prosecutors. *Psychological Review*, *109*, 451-471. . https://doi.org/10.1037/0033-295X.109.3.451

Vanmeter, K. C., & Hubert, R. J. (2014). *Gould's Pathophysiology for the Health Professions*. Misouri: Elsevier Saunders.

Wolf, Y. (2001). Modularity in everyday life judgments of aggression and violent behavior. *Aggression and Violent Behavior, 6,* 1-34. https://doi.org/10.1016/S1359-1789(99)00005-1

Wolf, Y. (2001). Modularity in everyday life judgments of aggression and violent behavior. Aggression and Violent Behavior, 6, 1-34. https://doi.org/10.1016/S1359-1789(99)00005-1

World Health Organization (2020). https://www.who.int/news-room/fact-sheets/detail/dementia

Table 1

*Main results (ANOVAs) for the judgment of blame in study 1*

| PARTICIPANTS | Effect | | Error | | | | |
|---|---|---|---|---|---|---|---|
| Factor | *df* | *MS* | *df* | *MS* | *F* | *p* | $\eta^2_p$ |
| YOUNG ADULTS | | | | | | | |
| Intent | 1 | 4855.01 | 33 | 79.88 | 60.78 | .000 | .65 |
| Consequence | 2 | 124.90 | 66 | 11.97 | 10.43 | .000 | .24 |
| Intent x Consequence | 2 | 2.28 | 66 | 5.24 | 0.43 | .649 | .01 |
| OLDER ADULTS | | | | | | | |
| Intent | 1 | 11673.36 | 39 | 25.55 | 456.94 | .000 | .92 |
| Consequence | 2 | 36.35 | 78 | 5.74 | 6.33 | .003 | .14 |
| Intent x Consequence | 2 | 8.46 | 78 | 5.96 | 1.42 | .248 | .04 |
| OLDER ADULTS WITH DEMENTIA | | | | | | | |
| Intent | 1 | 3373.39 | 39 | 99.42 | 158.93 | .000 | .49 |
| Consequence | 2 | 91.56 | 78 | 6.51 | 19.86 | .012 | .11 |
| Intent x Consequence | 2 | 51.67 | 78 | 15.64 | 3.30 | .042 | .87 |

1 Threshold for statistical significance: $p<.05$

Table 2

*Main results (ANOVAs) for the judgment of forgiveness in study 1*

| PARTICIPANTS | Effect | | Error | | | | |
|---|---|---|---|---|---|---|---|
| Factor | *df* | *MS* | *df* | *MS* | *F* | *p* | $\eta^2_p$ |
| YOUNG ADULTS | | | | | | | |
| Intent | 1 | 4511.06 | 33 | 42.32 | 106.60 | .000 | .76 |
| Consequence | 2 | 428.25 | 66 | 6.16 | 69.51 | .000 | .68 |
| Intent x Consequence | 2 | 5.82 | 66 | 6.17 | 0.94 | .393 | .03 |
| OLDER ADULTS | | | | | | | |
| Intent | 1 | 6551.11 | 39 | 101.90 | 64.29 | .000 | .62 |
| Consequence | 2 | 83.40 | 78 | 15.70 | 5.31 | .007 | .12 |
| Intent x Consequence | 2 | 4.53 | 78 | 9.74 | 0.47 | .630 | .02 |
| OLDER ADULTS WITH DEMENTIA | | | | | | | |
| Intent | 1 | 3568.96 | 39 | 81.45 | 43.82 | .000 | .53 |
| Consequence | 2 | 39.09 | 78 | 21.36 | 1.83 | .167 | .04 |
| Intent x Consequence | 2 | 57.69 | 78 | 22.63 | 2.55 | .084 | .06 |

Threshold for statistical significance: $p<.05$

*Table 3.*

*Main results of the ANOVAs performed on the "judgment of blame" data from the three groups in the three conditions (study 2).*

| | **Young adults** | | | | | | | **Older adults** | | | | | | | **Older adults with dementia** | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Effect | | Error | | | | | Effect | | Error | | | | | Effect | | Error | | | | |
| | df | MS | df | MS | *F* | *p* | *η²p* | df | MS | df | MS | *F* | *p* | *η²p* | df | MS | df | MS | *F* | *p* | *η²p* |
| | CONDITION 1 | | | | | | | | | | | | | | | | | | | | |
| Intent | *1* | *11516.97* | *33* | *100.71* | *114.35* | ***.000**** | .77 | *1* | *16555.75* | *39* | *67.68* | *244.62* | ***.000**** | .86 | *1* | *5097.34* | *39* | *173.61* | *29.36* | ***.000**** | .42 |
| Consequences | *2* | *260.62* | *66* | *16.88* | *15.43* | ***.000**** | .31 | *2* | *81.18* | *78* | *11.11* | *7.30* | ***.001**** | .15 | *2* | *26.17* | *78* | *16.56* | *1.58* | .212 | .03 |
| Apologies | *1* | *341.55* | *33* | *14.03* | *24.34* | ***.000**** | .42 | *1* | *532.14* | *39* | *18.46* | *28.83* | ***.000**** | .42 | *1* | *144.54* | *39* | *32.56* | *4.43* | ***.041**** | .10 |
| | CONDITION 2 | | | | | | | | | | | | | | | | | | | | |
| Intent | *1* | *17825.80* | *33* | *124.30* | *143.37* | ***.000**** | .81 | *1* | *18546.00* | *39* | *160.40* | *115.63* | ***.000**** | .74 | *1* | *7885.60* | *39* | *320.40* | *24.60* | ***.000**** | .38 |
| Consequences | *2* | *332.20* | *66* | *16.60* | *19.97* | ***.000**** | .37 | *2* | *157.00* | *78* | *14.80* | *10.62* | ***.000**** | .21 | *2* | *41.50* | *78* | *16.60* | 2.49 | .089 | .06 |
| Apologies | *1* | *536.30* | *33* | *13.10* | *40.88* | ***.000**** | .55 | *1* | *438.90* | *39* | *20.30* | *21.59* | ***.000**** | .35 | *1* | *11.90* | *39* | *13.40* | 0.88 | .352 | .02 |
| Negligence | *1* | *1727.60* | *33* | *36.50* | *47.39* | ***.000**** | .58 | *1* | *2274.60* | *39* | *45.20* | *50.35* | ***.000**** | .56 | *1* | *110.20* | *39* | *22.50* | *4.88* | ***.033**** | .11 |
| | CONDITION 3 | | | | | | | | | | | | | | | | | | | | |
| Intent | *1* | *27583.40* | *33* | *387.80* | *71.12* | ***.000**** | .68 | *1* | *29038.10* | *39* | *348.00* | *83.43* | ***.000**** | .68 | *1* | *9304.70* | *39* | *694.50* | *13.39* | ***.001**** | .25 |
| Consequences | *2* | *749.60* | *66* | *27.20* | *27.59* | ***.000**** | .45 | *2* | *846.90* | *78* | *46.70* | *18.12* | ***.000**** | .31 | *2* | *7.10* | *78* | *12.60* | 0.56 | .572 | .01 |
| Apologies | *1* | *370.90* | *33* | *21.10* | *17.58* | ***.000**** | .34 | *1* | *372.20* | *39* | *18.20* | *20.44* | ***.000**** | .34 | *1* | *.00* | *39* | *12.60* | 0.00 | .970 | .00 |
| Negligence | *1* | *2568.50* | *33* | *54.70* | *46.98* | ***.000**** | .58 | *1* | *4570.10* | *39* | *134.90* | *33.88* | ***.000**** | .46 | *1* | *11.70* | *39* | *13.60* | 0.86 | .358 | .02 |
| Proximity | *1* | *35.90* | *33* | *7.60* | *4.71* | ***.003**** | .12 | *1* | *10.40* | *39* | *12.30* | 0.84 | .363 | .02 | *1* | *9.10* | *39* | *11.50* | 0.78 | .381 | .01 |

***** Threshold for statistical significance: p<.05

*Table 4.*

*Main results of the ANOVAs performed on the "judgment of forgiveness" data from the three groups in the three conditions (study 2).*

| | **Young adults** | | | | | | | **Older adults** | | | | | | | **Older adults with dementia** | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Effect | | Error | | | | | Effect | | Error | | | | | Effect | | Error | | | | |
| | df | MS | df | MS | *F* | *p* | $\eta^2p$ | df | MS | df | MS | *F* | *p* | $\eta^2p$ | df | MS | df | MS | *F* | *p* | $\eta^2p$ |
| | CONDITION 1 | | | | | | | | | | | | | | | | | | | | |
| Intent | *1* | *5253.18* | *33* | *140.06* | *37.51* | ***.000**** | .53 | *1* | *8492.42* | *39* | *159.99* | *53.08* | ***.000**** | .57 | *1* | *3689.09* | *39* | *173.06* | *21.32* | ***.000**** | *.35* |
| Consequences | *2* | *713.51* | *66* | *14.80* | *48.22* | ***.000**** | .59 | *2* | *234.14* | *78* | *15.74* | *14.87* | ***.000**** | .27 | *2* | *4.83* | *78* | *12.87* | 0.38 | .688 | .00 |
| Apologies | *1* | *1265.65* | *33* | *23.90* | *52.96* | ***.000**** | .61 | *1* | *1483.33* | *39* | *39.94* | *37.14* | ***.000**** | .48 | *1* | *358.63* | *39* | *62.96* | *5.70* | ***.022**** | *.12* |
| | CONDITION 2 | | | | | | | | | | | | | | | | | | | | |
| Intent | *1* | *13680.08* | *33* | *132.19* | *103.49* | ***.000**** | .75 | *1* | *9346.14* | *38* | *251.13* | *37.22* | ***.000**** | .49 | *1* | *3946.70* | *39* | *331.70* | *11.90* | ***.001**** | *.23* |
| Consequences | *2* | *1096.79* | *66* | *19.39* | *56.57* | ***.000**** | .63 | *2* | *504.52* | *76* | *30.99* | *16.27* | ***.000**** | .29 | *2* | *96.40* | *78* | *13.10* | *7.34* | ***.001**** | *.15* |
| Apologies | *1* | *1493.38* | *33* | *37.44* | *39.88* | ***.000**** | .54 | *1* | *1317.06* | *38* | *37.72* | *34.91* | ***.000**** | .47 | *1* | *201.60* | *39* | *100.90* | 2.00 | .166 | .04 |
| Negligence | *1* | *1000.38* | *33* | *14.82* | *67.49* | ***.000**** | .67 | *1* | *555.23* | *38* | *34.56* | *16.06* | ***.000**** | .29 | *1* | *0.0* | *39* | *15.70* | 0.00 | .983 | .00 |
| | CONDITION 3 | | | | | | | | | | | | | | | | | | | | |
| Intent | *1* | *23540.20* | *33* | *368.70* | *63.85* | ***.000**** | .65 | *1* | *19554.10* | *39* | *414.80* | *47.14* | ***.000**** | .54 | *1* | *4181.30* | *39* | *664.90* | *6.29* | ***.016**** | *.13* |
| Consequences | *2* | *1451.30* | *66* | *36.40* | *39.83* | ***.000**** | .54 | *2* | *1762.30* | *78* | *55.00* | *32.02* | ***.000**** | .45 | *2* | *42.30* | *78* | *24.40* | 1.74 | .183 | .04 |
| Apologies | *1* | *2372.70* | *33* | *66.10* | *35.88* | ***.000**** | .52 | *1* | *2218.20* | *39* | *70.10* | *31.62* | ***.000**** | .44 | *1* | *373.50* | *39* | *120.30* | 3.10 | .086 | .07 |
| Negligence | *1* | *1340.00* | *33* | *30.01* | *44.46* | ***.000**** | .57 | *1* | *2593.10* | *39* | *144.50* | *17.94* | ***.000**** | .31 | *1* | *0.10* | *39* | *13.80* | 0.05 | .941 | .00 |
| Proximity | *1* | *397.90* | *33* | *19.40* | *20.46* | ***.000**** | .38 | *1* | *65.40* | *39* | *13.40* | *4.88* | ***.033**** | .11 | *1* | *8.70* | *39* | *14.30* | 0.61 | .439 | .01 |

***** Threshold for statistical significance: p<.05

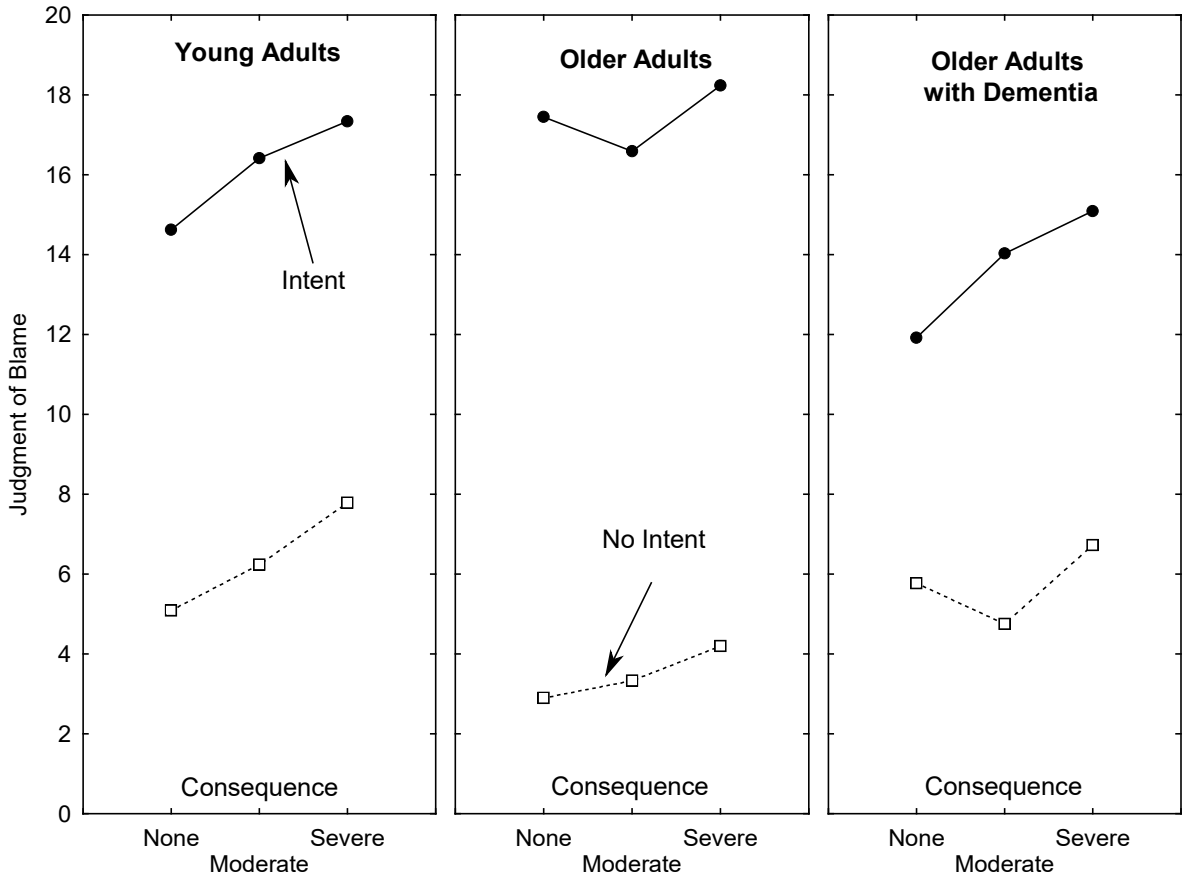


*Figure 1*. Effects of intention and consequence on the judgment of blame by young adults, older adults, and older adults with dementia (study 1)

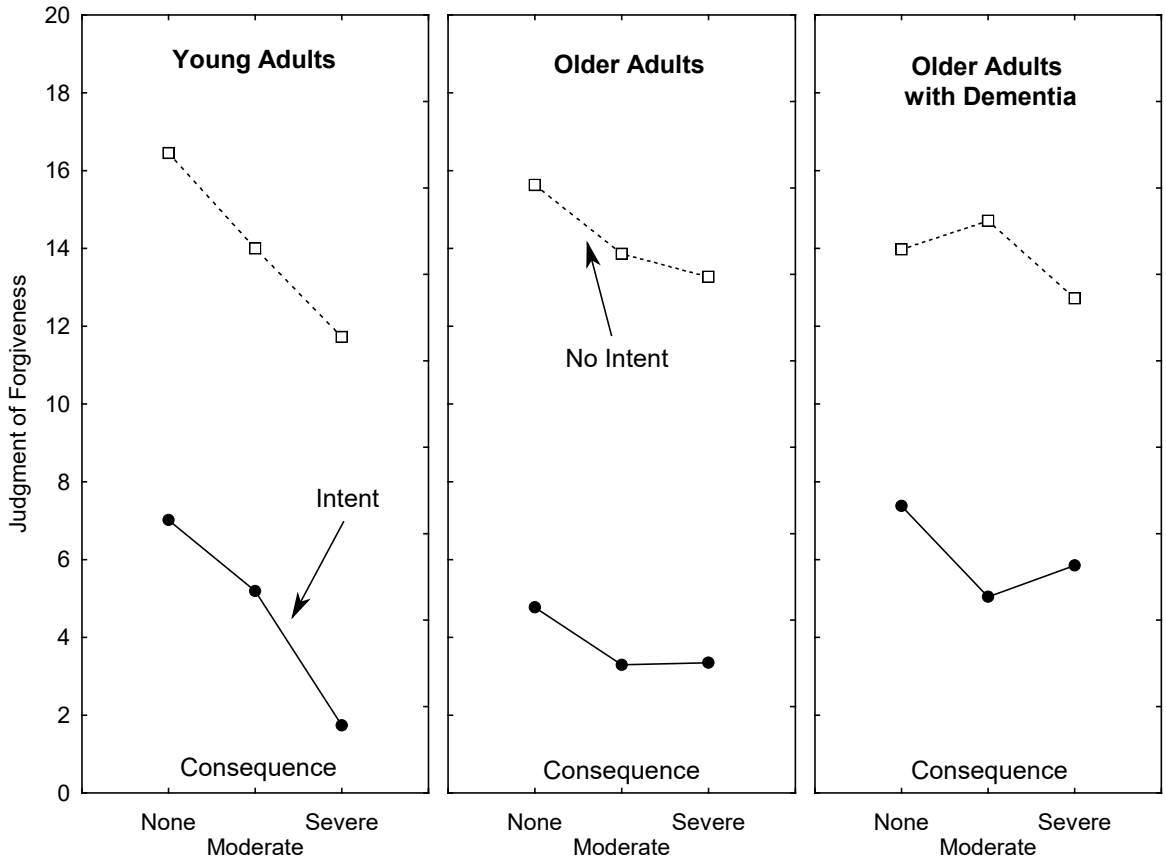


*Figure 2*. Effects of intention and consequence on the judgment of forgiveness by young adults, older adults, and older adults with dementia (study 1)

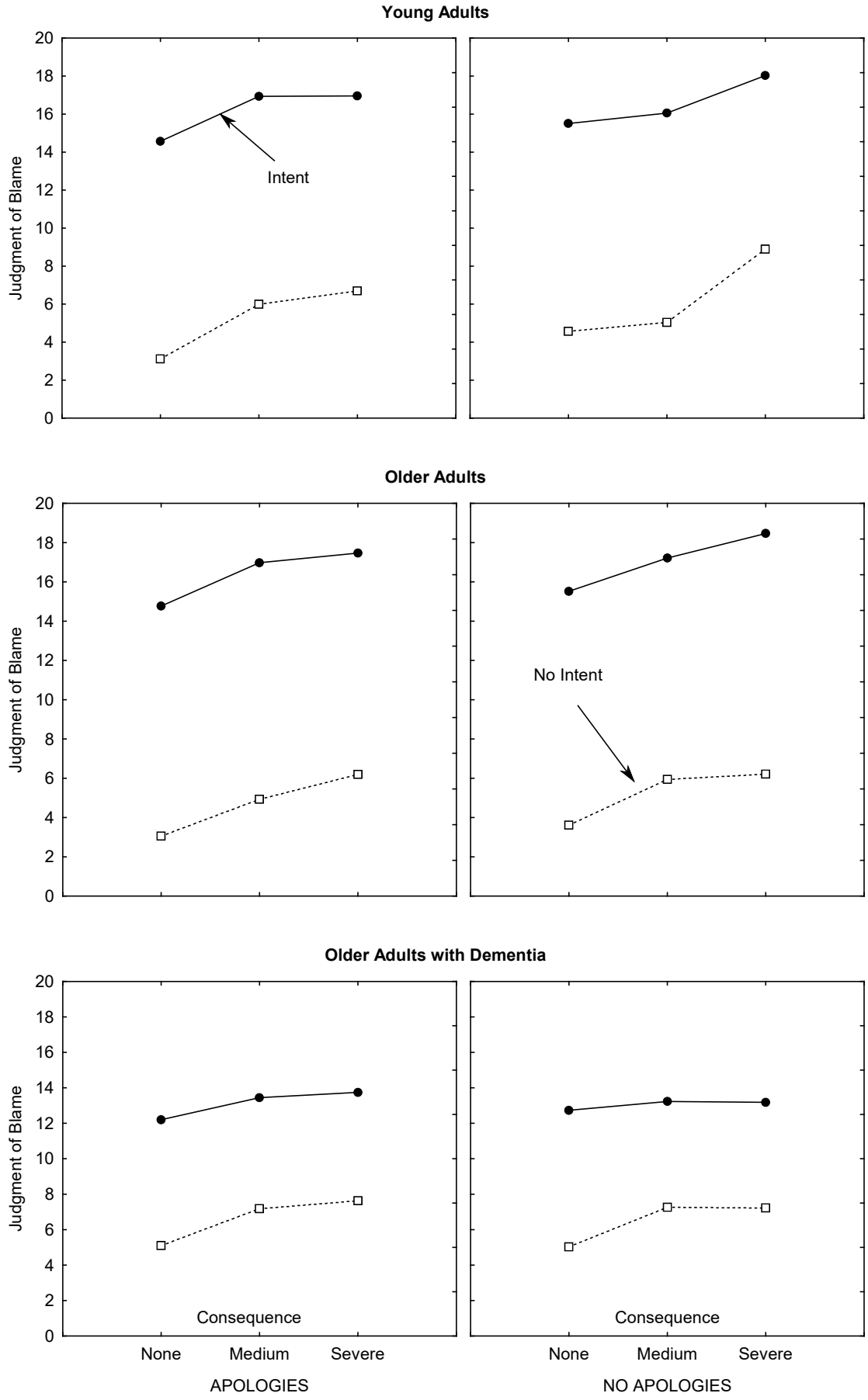


*Figure 3.* Effects of intention, consequence and apologies on the judgment of blame by young adults, older adults and older adults with dementia (study 2).

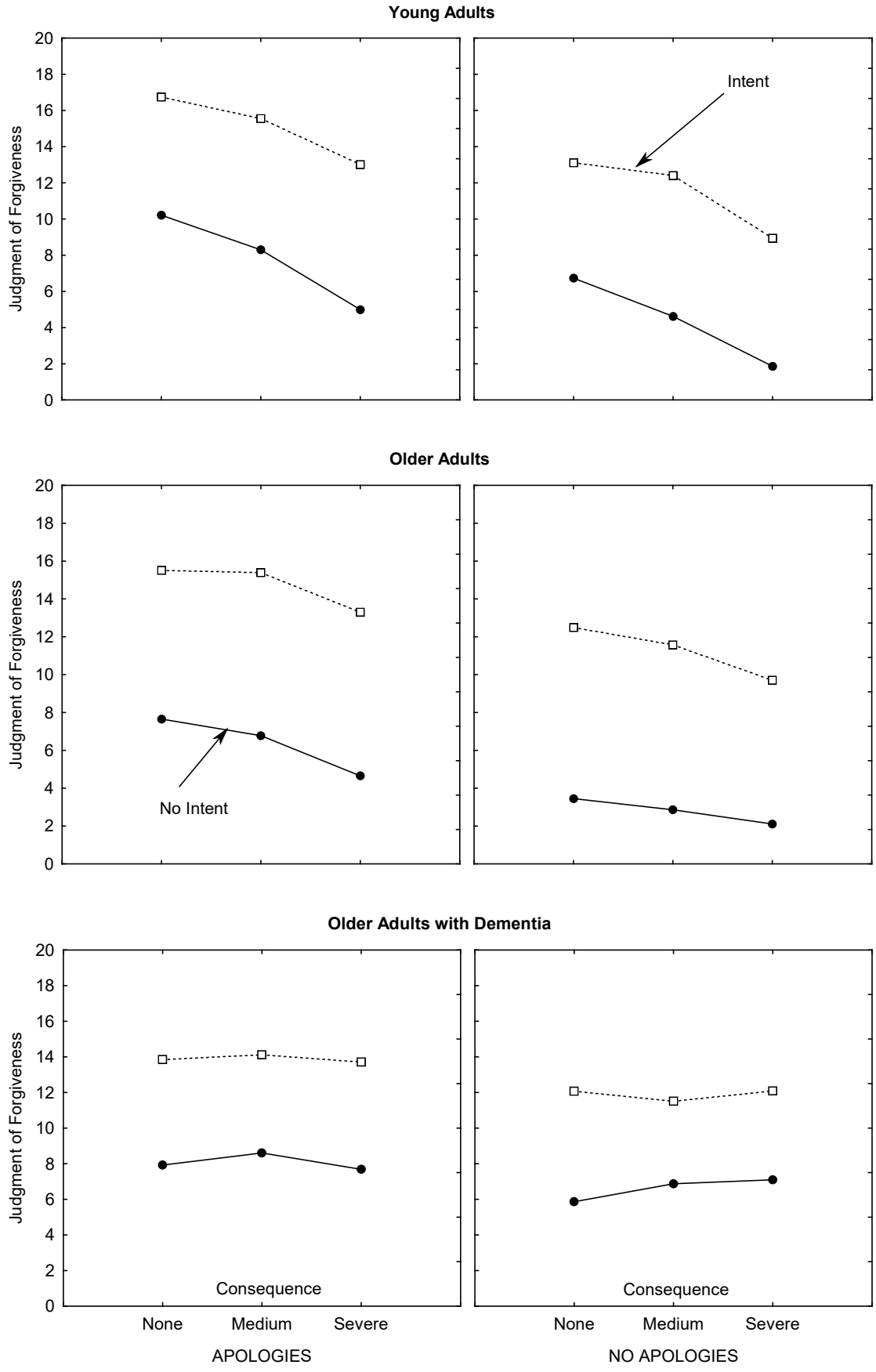


*Figure 4.* Effects of intention, consequence and apologies on the judgment of forgiveness by young adults, older adults and older adults with dementia (study 2).