Research Square

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Examining the influence of the communication frame and gender identification in the intention to screen for Hepatitis C

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Abstract

Background: Hepatitis C is present all over the world with a high prevalence in European Regions, and Italy appears to be one of the European countries with an estimated prevalence of the chronic disease in about 3% of the population (1.5 million people). The scientific evidence shows that risky behaviours are widespread among young people and require particular attention and adequate measures. The aim of this study was to evaluate the influence of different narrative communicative scenarios regarding the intention of students to carry out diagnostic testing for Hepatitis C and if gender identification, and the increase in information about the infection risk could influence the students' propensity to undergo a medical test.

Methods: The study was voluntarily attended by 850 university students. Participants were administered three narrative scenarios with different frames (positive, negative, ambivalent) and including two gender options (male and female) for the main character of the story.

Results: Results showed that in order to stimulate the propensity for a diagnostic check in the juvenile population, the use of a negative scenario with a same gender character was always more effective than the use of a positive framed scenario, even if the level of knowledge about the disease was remarkable.

Conclusion: The findings of this study can ultimately help the policy makers develop communication campaigns to raise awareness of the risk and encourage medical screening that needs to be adapted to target populations.

Background

Hepatitis C disease is a major health problem that consists in an inflammation of the liver caused by Hepatitis C virus (HCV) infection. HCV can have both acute and chronic consequences and it is one of the worldwide causes of cirrhosis and hepatocellular carcinoma (1, 2). New HCV infections are usually asymptomatic or the symptoms can take up to 30 years to manifest (3). The consequence of this gap is that about 70% of infected people are not aware they are infected, therefore they don't follow therapies or treatments and transmission happens very easily (4–7). Hepatitis C is present all over the world with a high prevalence in European Regions. The World Health Organization (WHO) estimates 71 million people affected by chronic HCV and 399,000 deaths in 2016 (3).

Italy appears to be one of the European countries with the highest number of Hepatitis C patients. Epidemiological data show an estimated prevalence of the chronic disease in about 3% of the population (1.5 million people), with a very variable geographical distribution. Frequencies of infections are higher in the Centre and South of Italy than in the North (8, 9). In 2018 the SEIEVA (Italian Integrated Epidemiological System for Acute Viral Hepatitis) recorded an incidence of new acute cases of 0.1 per 100,000 inhabitants mostly in men in the age group 35–54 (10).

A study promoted by Doxa Pharma “Italians and Hepatitis C” has highlighted citizens’ lack of information regarding this disease. The study found that 69% of respondents knew little or nothing about Hepatitis C and tended to underestimate its severity (11).

Today, the major risk factors of getting infected are surgery, blood transfusions, organ transplants, percutaneous exposure during cosmetic treatments, unprotected sexual relations and intravenous drug use (3). Piercing and tattoos are also risky for Hepatitis C infection when these practices are performed with non-sterile instruments and in unsafe environments (12). Even manicures or pedicures performed with non-sterilized or disposable instruments represent a significant danger of infection.

Many practices that are related to the transmission of the virus can be considered more common between young people. The scientific evidence shows that risky behaviours are widespread among young people and require particular attention and adequate measures, not only because of the serious health and psycho-social implications, but also because multiple risky behaviours are frequently associated (12–15). For this reason, we decided to carry out research in this specific age target focusing on university students.

Health promotion in university students has not always been considered a priority in targeting preventive policies and actions because they consider themselves to be in a relatively healthy phase of their life. The period of university life is instead a very critical one, known to be a dynamic transition from childhood to adulthood. During this time young people should gradually learn to assume responsibility for their own health, but they often assume unhealthy behaviours and habits (poor eating habits, little rest, physical inactivity, smoking, alcohol and drug abuse and risky sexual behaviour) that can negatively affect health in the short, medium and long term (16, 17). The university environment can stimulate some students to assume risky lifestyles for various reasons: the first time away from families and their rules; personality traits; experiencing rebel models or just adult models, self-challenge. An unconstrained freedom mixed with a sense of invulnerability and a strong desire for exploration can lead to the development of behaviours that are not always healthy (18–19).

Since there is no effective vaccination against the Hepatitis C virus, therefore, information and health education represent the best preventive strategy (6). Increasing the level of awareness and knowledge can reduce the risk of transmission and lead to healthier behaviours (20, 21). Other studies have shown that the lack of knowledge and a low level of awareness are also a big barrier to HCV screening (22, 23).

Previous research examined the framing effect on individual choices in terms of prevention and health treatments, identifying different modalities such as the framing of attributes, objectives and risky choices (24–27).

Narrative scenarios create a simulation of a possible future that can be experienced as a realistic, consistent and compelling plot allowing to explore a possible reaction of the person (28). Fictionalized scenarios are experiments conceived with a high degree of imagination and realism; they explore in particular the human and social dimension in the setting of everyday life (29). The application of a

narrative scenario approach has been used in sociology, communication and marketing research (30–32) and recently in health psychology as well (33–35).

The aim of this study was to evaluate the influence of different narrative communicative scenarios regarding the intention of students to carry out diagnostic testing for hepatitis C and to investigate if the gender identification also influences the results. A further research goal was to understand whether the increase in information on the risk of hepatitis C infection could further motivate young people to decide to undergo a diagnostic test for hepatitis C. We think the results of this study could be useful for healthcare authorities in order to better organize awareness campaigns and activities encouraging HCV screening, improving the level of knowledge about the disease, its transmission and consequences in the target investigated.

Methods

Hypotheses

a. The use in a preventive communication intervention of a narrative frame with different content orientation (positive, negative, ambivalent) can affect the propensity (immediate, medium-term, long-term, null) to perform a diagnostic test for hepatitis C.
b. Gender identification with the protagonists of each narrative frame can also influence the propensity to perform a diagnostic test.

Participants

The study was voluntarily attended by 850 university students, 405 male (47.6%) and 445 female (52.4%), aged between 18 and 32, M = 25 SD = 5.8. Participants were assured anonymity and the use of data in aggregate form for research purposes only. Tools administration took place upon release and signing of the form for an informed consent of participation in accordance with the Declaration of Helsinki.

Tools

1) A socio-personal data questionnaire and collection of the knowledge possessed by the participants on hepatitis C; 2) Evaluation of the importance attributed to performing a personal diagnostic test measured by means of an item on Likert scale 1–5 ranging from 1 (not at all) to 5 (very much); 3) Three narrative scenarios with different values (positive, negative, ambivalent) and including two gender options (male and female) in the textual character. E.g.: *Positive Scenario*: Francesca is a 25-year-old girl. Three years ago, following a check-up, she discovered that she was suffering from hepatitis C. After the discovery of the disease she immediately started the course of treatment. Today Francesca is married, has a child and leads a normal and satisfying life. For Francesca the timeliness of the check-up and the beginning of the therapy were decisive in order to prevent the disease from becoming chronic and causing serious consequences to the liver system. *Negative scenario*: Francesca is a 25-year-old girl who was referred to

visit her family doctor following the appearance of worrying symptoms such as jaundice (yellowish complexion of the skin and eyes), nausea, vomiting and abdominal pain. The check-up revealed the existence of chronic hepatitis C. The onset of the infection dates back to 5 years ago. During this time, Francesca did not undergo any tests. Today, despite having cured the infection, Francesca has suffered serious damage to her liver system, which affects the quality of life and life expectancy. *Ambivalent scenario*: Marco is a 25-year-old boy. After a medical check-up he had a year ago, he discovered that he had hepatitis C. He went to a specialist and was informed about the existence of the latest cure with a medicine called “sofosbuvir”, which eradicates the disease definitively without significant side effects. Unfortunately, the treatment is extremely expensive, about 60,000.00 euros and is not provided by the national health service. At this point, Marco was forced to access the old treatments, that have poor effectiveness and serious side effects. 4) A leaflet with additional information on the Hepatitis C infection; 5) Evaluation of the propensity to undergo a diagnostic check, measured with multiple response items 1–6, ranging from 0 (“I have no intention to undergo a check”) to 6 (“I intend to undergo a check immediately”).

Sample Selection and Questionnaire Administration Procedures

The sample consisted of 843 individuals, almost balanced by gender, randomly divided up to 16 groups depending on the experimental assignment condition, according to the modalities of the three variables considered: 2 modalities for the variable *gender* (male; female); 2 modalities for the variable *additional information* (info yes; info no); 4 modalities for the variable *scenario* (positive, negative, ambivalent, no scenario).

In order to verify the hypothesis that the identification, based on gender, has some effect on the propensity for diagnostic control, the gender variable of the protagonist of the story has also been considered. In this case the sample is considered divided into 28 groups, according to the research model 2 × 2 × 7: two modalities for the variable *gender* (male; female); two modalities for the variable *additional information* (info yes; info no); seven modalities for the variable *scenario* (positive with male character; positive with female character; negative with male character; negative with female character; ambivalent with male character; ambivalent with female character; no scenario).

With respect to this variable, a further subdivision was considered for the assignment of a narrative frame that considered the identification with the same gender or otherwise: therefore, in one half, a character of the same gender as the participant was presented; in the other half, a character of the opposite gender. The same partition was used to divide homogeneously (with respect to gender) among the participants the assignment of a supplementary hepatitis C information sheet or otherwise.

Table 1
Research sample distribution

Category variable	Modalities	Sub-modalities	Relative Size
Gender (F1)	Male (F1,1)		405
	Female (F1,2)		445
Additional Information (F2)	Yes (F2,1)		421
	No (F2,2)		422
Scenario (F3)	Positive (F3,1)	male character (F3,1,1)	104
		Female character (F3,1,2)	106
	Negative (F3,2)	male character (F3,2,1)	113
		Female character (F3,2,2)	118
	Ambivalent (F3,3)	male character (F3,3,1)	103
		Female character (F3,3,2)	100
	No scenario (F3,4)		206

The protocol therefore provided for, in sequence:

1. 1. Collection of personal data in anonymous form (the whole sample);
2. 2. Administration (the whole sample) of a form to detect: a) knowledge possessed by the participants regarding hepatitis C and potential risk behaviors; b) estimate of the risk of personal contagion; c) controls carried out or presence of a mental scenario oriented to health control; d) national epidemiological estimate on hepatitis C; e) direct knowledge of cases of hepatitis C.
3. 3. Administration (49% N = 421) of a detailed information leaflet on the modalities of contagion, with percentage weights (transfusions, sexual intercourse, piercing, tattoos, dental care, personal care - barber, hairdresser and beautician).
4. 4. Administration (24.7% N = 210) of a sheet with the Positive Therapeutic Scenario (early detection of infection and early therapeutic treatment with effective results).
5. 5. Administration (27.2% N = 231) of a sheet with the Negative Therapeutic Scenario (description of treatments with heavy and ineffective side effects).
6. 6. Administration (23.9% N = 203) of a sheet with the Ambivalent Scenario (description of new drugs with high efficacy and low side effects “sofosbuvir”, but not accessible due to high costs).
7. 7. Absence of scenarios for control group (24.2% N = 206).
8. 8. Administration (the whole sample) of a final item (Likert 1–6) to measure the propensity (timely or procrastinating) of the participants to undergo a diagnostic test for hepatitis C.

Statistical Analysis

The data were processed using the statistical software SPSS version 22. The main analyses performed were: descriptive statistics to illustrate socio-demographic information and participants' knowledge about hepatitis C; Pearson bivariate correlations between Risk Perceptions and Value attributed to personal diagnostic controls, significant at p <. 005 and at p < .001, 2-tailed); one-way Anova to assess whether the estimated spread of the disease could be significantly associated with the value attributed to personal controls; factorial Anovas to assess the cross effects between narrative scenario types, supplementary of information and gender identification in the scenarios.

Results

Descriptive analysis

The study was attended by 843 students (males 47.6%) with an average age of 24 (SD = 5.89). 28.6% stated that they had already taken a hepatitis C test in the past. 15.8% had one or both parents working in healthcare. 14.7% knew at least one person with hepatitis C. 5.5% said they knew two or more people with hepatitis C. Neither the level of education nor the profession of the parents had any influence on the importance attributed to undergoing a diagnostic test for Hepatitis C.

The assessment of the students' knowledge about hepatitis C was carried out by summing up the exact answers to the questionnaire. The analysis of the distribution of the answers indicated that out of 19 questions proposed, the average of the correct answers was 12.8 (SD = 2.61; min 4 and max 17; skewness: − .392; kurtosis: − .207). About half of the sample (53.3%) showed that they had general knowledge on Hepatitis C of low to medium level.

Comparing the national estimated spread of hepatitis C by the students with their value placed on medical checks, it was found that those who tended to underestimate the incidence of the infection, considering it in about 30,000 (M_1) and about 400,000 (M_2) cases estimated in Italy, had significantly lower averages of value attribution to medical checks, while those who indicated the real official estimation of about 1,000,000 (M_3) in Italy or overestimated the prevalence with more than 6,000,000 (M_4) cases attributed greater value to personal medical checks: F(3.849) = 10,091 p = .001 Eta^2 = .04 OP = .98; M_1 = 3.43 SD = .07; M_2 = 3.45 SD = .05. M_3 = 3.78 SD = .05; M_4 = 3.85 SD = .12 95% CI [3.55; 3.70].

A positive correlation was found (.162**) between the attribution of value on the diagnostic check and the probability of risk attributed to the category of university students to which the participants of the study belonged.

Narrative scenarios and integration of information on the propensity for medical check

The comparison between the narrative scenarios was carried out to assess their impact on the propensity to undergo a future diagnostic check at the end of the communication intervention, considering both the experimental condition of supplementary information on Hepatitis C provided to the participants and the

condition of no supplementary information provided. The measurement of the propensity to undergo the medical check showed a substantial negative kurtosis (-1.34) that was corrected (-1.07) with the logarithmic transformation X* = Log10(X).

A factorial Anova between subjects was conducted considering model 2 (supplementary information / no supplementary information) x 4 (positive scenario, negative scenario, ambivalent scenario, no scenario). A significant main effect for *scenarios* was found: $F(2,419) = 5.652$ $p = .004$ $eta^2 = .03$ $OP = .86$, as well as a significant main effect for *information*: $F(3,419) = 3.120$ $p = .03$ $eta^2 = .02$ $OP = .83$. In the case of the absence of supplementary information, Anova found that the propensity for the diagnostic test was significantly higher in the fourth group (without scenarios) compared to the first group (positive scenario): $MD = - .092^*$ for $p < .05$. In the second case with the presence of supplementary information, the propensity for the diagnostic check was significantly higher in the second group (negative scenario) compared to the first group (positive scenario): $MD = - .079^*$ for $p < .05$.

Figure 1 shows the changes in the propensity for a diagnostic test according to the given narrative scenario and the supplementary information. The supplementary information produced a significant lowering of the propensity to undergo a medical check in the condition without scenarios and in the one with the positive scenario. There was no change in the negative scenario condition.

[Insert Fig. 1 near here]

The effect of gender identification on the propensity for medical check

In order to evaluate the effect of the identification with the character's gender of the given scenario, both in the experimental condition of supplementary information and no supplementary information provided, a factorial Anova 3 (positive scenario, negative scenario, ambivalent scenario) x 2 (same gender identification / opposite gender identification) x 2 (supplementary information / no supplementary information) was conducted. Significant main effects were found for scenarios: $F(2,829) = 4,505$ $p = .01$ $eta^2 = .02$ $OP = .82$; and gender identification: $F(2,829) = 5,589$ $p = .02$ $eta^2 = .02$ $OP = .80$. No significances resulted for the variable supplementary / no supplementary information. As shown in Fig. 2, the propensity for a diagnostic check was significantly higher with the use of the negative scenario in the condition of gender identification ($MD = - .093^*$ for $p < .05$).

[Insert Fig. 2 near here]

In summary, the results showed that in order to favour the propensity for a diagnostic check, the use of a negative scenario with a character of the same gender as the participant is always preferable to the use of positive framed scenarios. When the scenarios do not present a possibility of gender identification, they are less effective than a modality of intervention that does not use narrative scenarios.

Discussion

For more than half of the sample in the study, the level of general knowledge about Hepatitis C infection was medium to high, with only 9% of the sample providing less than 10 out of 19 correct answers to the questionnaire administered. This result is similar to what was found in the study by Daniali et al. (2015), although in that case the sample was made up of students from the medical-health area, where a greater average knowledge and awareness of the risks related to such infections was likely to be expected (6). A common result between our study and the one mentioned above was the absence of positive correlation between the level of knowledge and the behavioral intention of prevention. The level of knowledge was not associated with the socio-cultural level of belonging, suggesting that there are other sources of information (presumably school, friends, direct and indirect contact with infected people). 30% of the sample had already undergone a hepatitis C test and 20.2% had direct knowledge of people with hepatitis C. The importance attached to personal diagnostic testing was not directly associated with the level of specific knowledge about the infection, but was rather proportionate to the estimated spread of Hepatitis C throughout the country. Those who tended to underestimate the spread of infection consequently attached less value to medical monitoring (35, 36). However, there was an association between the importance attributed to diagnostic control and the level of risk attributed to the category of university students (to which the participants belonged). These results appear congruent with Kasperson, et al. (1988) (37).

With regard to the effect of the use of narrative scenarios on the propensity for diagnostic control, it was found that the group to which the negative scenario was presented reported significantly higher levels of propensity for control, especially compared to the group with the positive scenario. It was likely that the positive scenario had a reassuring effect that limited the participants' propensity for control: the early diagnosis was followed by an adequate course of treatment that allowed the protagonist to lead a substantially normal life; while the negative scenario increased the levels of fear: the late diagnosis was followed by a progressive worsening of health conditions, by a heavy impact of drugs and their side effects on the protagonist's quality of life. In the ambivalent scenario it was probably possible to activate a simultaneous activation of different emotional states, such as fear, anger and resignation; here it could be hypothesized that the response to the medical check could have depended on the prevailing emotion aroused by the scenario and that in any case the presence of more than one emotion does not make it possible to know which and how this prevailed in the participant. The placement of the level of propensity for control in an intermediate position with respect to the groups with positive and negative scenarios suggests that the activating effect of fear could have received a moderation from any feelings of anger and resignation induced by the representation of such a scenario.

The administration of the supplementary information sheet after the completion of the initial questionnaire had a substantial reassuring effect, especially in the group that had only received the initial questionnaire delivery and not the narrative scenario; the effect is also partly detectable on the group with a positive scenario.

In order to explain this result, we can hypothesize that the reassuring effect of the form was induced in particular by the points in which the participant was informed that in any case the greatest risk of

contagion was through blood. This may have reassured all those who felt they were leading a lifestyle far from such a risk condition.

It is worth noting that the initial questionnaire consisted of 19 questions addressed to the participant in the second person on the knowledge they had about hepatitis C (i.e. “How many people do you know who are affected ...”; “Have you ever undergone a check ...”; “How many people are infected with hepatitis C ...”). These probably activated, in association with mental images related to the situations, a personal self-referential response (with internal control locus), during which the participant did not know if he was responding correctly, but certainly in a manner consistent with his imagination. The recurrence among the questions of locutions that alluded directly to risk, damage, danger and diffusion favoured the attention to a personal scenario of reference and risk assessment. Even where the person considers a situation to be at risk, and in reality it is not, he will still be afraid of that situation and will try to implement strategies of self-protection (38). The next information sheet, associated with an authoritative source, therefore becomes reassuring and reduces one's fears by correcting distorted or erroneous knowledge.

This effect was definitely evident in the experimental situation in the absence of a scenario, where the propensity for diagnostic control was greater only in the absence of supplementary scientific information from an authoritative source and without any reference to a possible course of treatment. Therefore, we can hypothesize that in such a condition the person is alone with the idea of the disease and has only himself as the reference point of information (personal level).

The reassuring effect of the information was less marked in the scenarios, but still present, although not statistically significant, in the positive and ambivalent scenarios. In the negative scenario it was irrelevant and fear probably prevailed, not only related to Hepatitis C, but also to the prognosis and the treatment process. This would explain why the propensity for control was statistically significant in the worst case scenario. The positive and ambivalent scenarios, however, suggested that there is a cure and probably lower the fear of the disease; on the ambivalent scenario we can hypothesize the stimulation of anger or resignation as the last emotion with which the person came into contact, when the information that passed was that the cure existed but was not available for economic reasons.

Compared to the research hypothesis, we would have expected that the scenarios would have played a greater role in stimulating the idea of undergoing diagnostic investigation to facilitate early diagnosis. In this case we hypothesize that the third person scenario had a reassuring or defensive role for the participant, since a change of perspective probably occurs by moving from a subjective self-referencing point of view to an external hetero referent point of view. In this interpretative framework the scenario would have activated a shift from a personal level of “me and the disease” to an impersonal level of “the Other and the disease” (39).

When the Other is of the same sex the effect of identification produces a greater propensity for statistically significant diagnostic screening in the negative scenario condition. We can therefore hypothesize that in this case, with the prevalence of the activation of fear, when the Other is perceived as

“similar to me”, the danger however concerns me (it can be associated to my gender) and for this reason a greater propensity to the diagnostic test is activated.

The results of the study showed that, at least in the juvenile population, even if the level of awareness of the disease is medium-high, the propensity for diagnostic control is positively associated with the use of a negative scenario, which leverages fear as a motivating emotion (40).

The low propensity for screening can, however, be read positively as the effectiveness of both information campaigns and security protocols implemented over the past decades. Considering that the sample was sufficiently well informed (91% with medium-high knowledge) and a third had already undergone a test for Hepatitis C, providing correct scientific information, despite resulting in a lower propensity for screening, this can be interpreted not as an irresponsible gesture, but as a conscious identification of risk situations, choosing to undergo screening only in the necessary situations.

Conclusion

In conclusion, the findings of this study can help the policy makers develop communication campaigns addressed at raising awareness and scaling up screening, as also suggested by WHO in the document “*Global Health Sector Strategy on Viral Hepatitis, 2016–2021*”, according to specific populations (20). Interventions aimed at enhancing HCV disease risk awareness may help to reduce the barriers and increase HCV screening uptake.

Abbreviations

HCV
Hepatitis C Virus; SEIEVA:Sistema Epidemiologico Integrato dell’Epatite Virale Acuta (Italian Integrated Epidemiological System for Acute Viral Hepatitis); WHO:World Health Organization; EG:example given; SD:standard deviation; OP:observed power; MD:mean difference.

Declarations

Ethics approval and consent to participate

The protocol was approved by the *Institutional Review Board* of the University of Cassino and Southern Lazio. Tools administration took place upon release and signing of the form for an informed consent of participation.

Consent for publication

Not applicable.

Availability of data and materials

The datasets during and/or analysed during the current study available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Authors' contributions: PD, GV and SM designed the study. PD, GV, LF, FB and SM analyzed the data and discussed the results. PD, FB and SM drafted the manuscript. LF and SM revised the manuscript. All authors approved the final manuscript. Finally, the authors have agreed to be accountable for all aspects of the manuscript in ensuring that questions related to the accuracy or integrity of any part of it are appropriately investigated and resolved.

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Figures

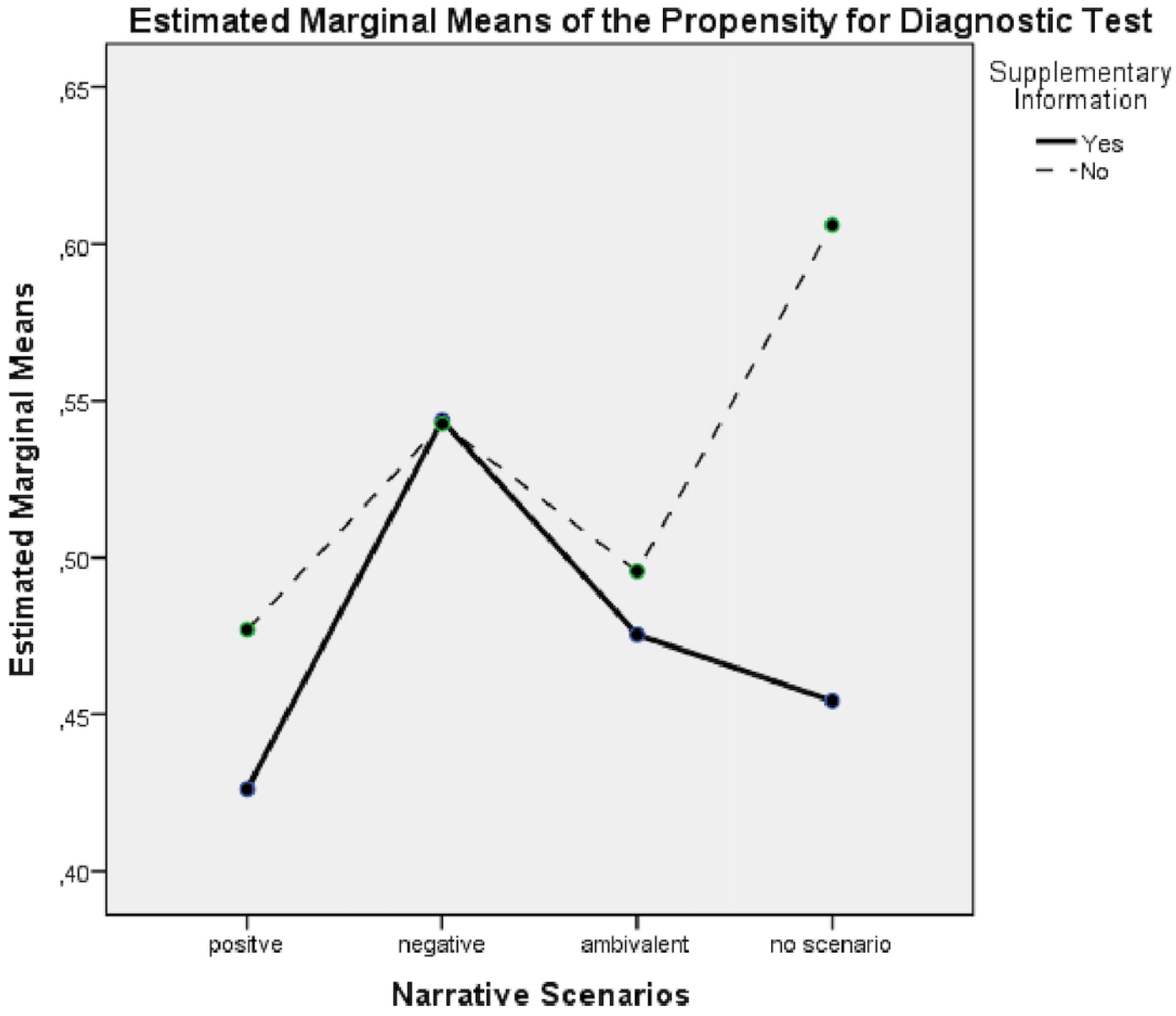


Figure 1

Propensity for a Diagnostic Test according to the given Narrative Scenario and the supplementary information

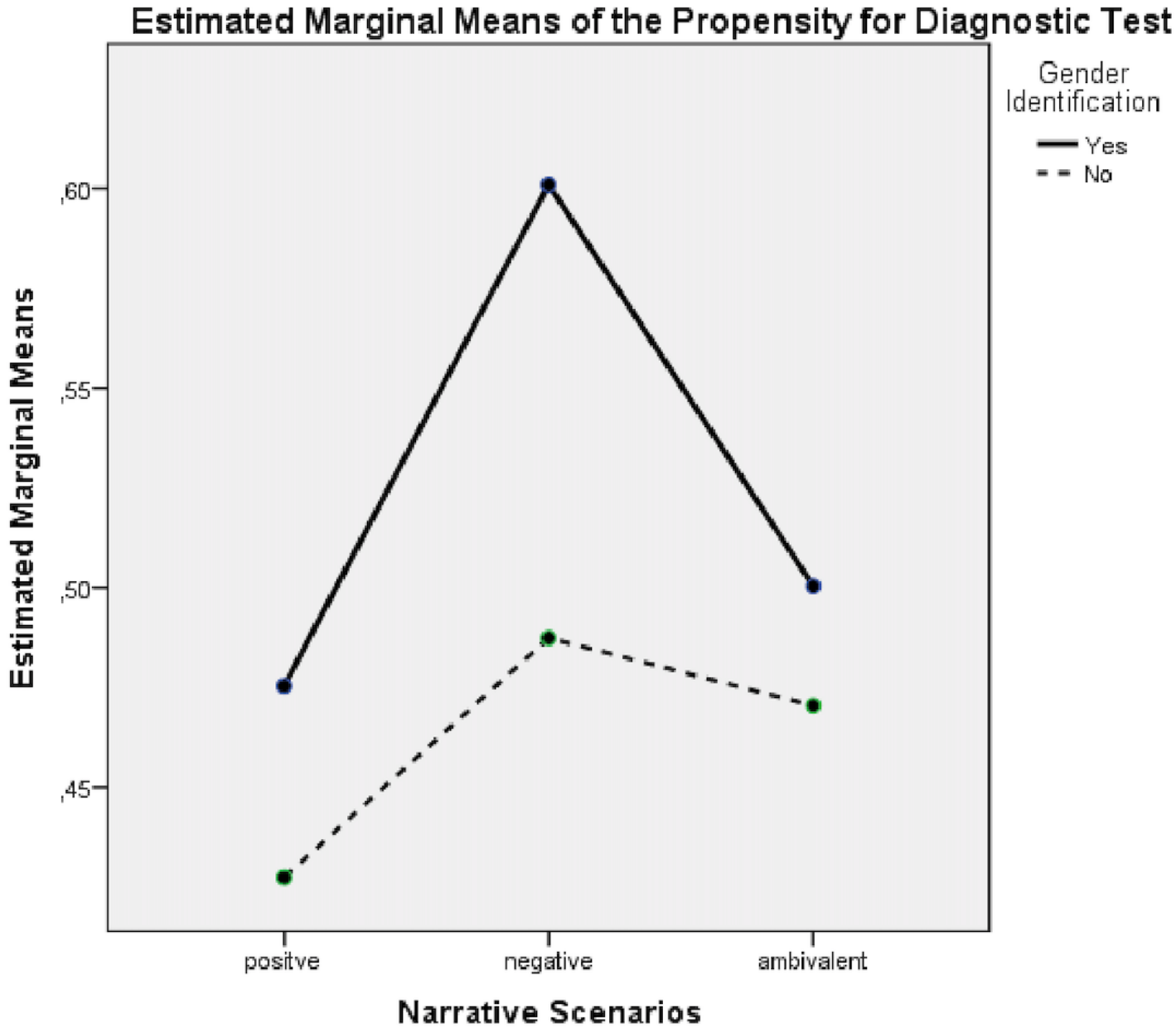


Figure 2

Propensity for a Diagnostic Test according to the given Narrative Scenario and Gender Identification