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► **To cite this version:**

Kamilla Khamzina, Sylvie Huet, Guillaume Deffuant, Michel Streith, Serge Guimond. Making the planet green again: The interplay of attitudes and group norms in the conversion to organic farming. *Journal of Applied Social Psychology*, 2021, 51 (11), pp.1073-1088. 10.1111/jasp.12825. hal-03405530

HAL Id: hal-03405530

<https://hal.science/hal-03405530>

Submitted on 16 Nov 2021

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**Making the Planet Green Again: The Interplay of Attitudes and Group Norms in the
Conversion to Organic Farming**

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Data availability statement

The data and codebooks for the present research are openly available at
https://osf.io/fnuhd/?view_only=196cc99e553f407ea1300a84da842a47

Funding information

This research was supported by a grant from the program ‘emerging themes’ of the Auvergne region for the project ASSOCIATIONE.

Declaration of interest statement

The authors have no competing interests to declare.

Ethics approval statement

All data were fully anonymized prior to being accessed by the authors. The survey was conducted in accordance with the 1964 Helsinki declaration and its later amendments.

Informed Consent

Informed consent was obtained from all individual adult participants included in the study.

Acknowledgments

We thank the IDARI project (2003-2006), funded by EC under the European Commission's Framework Program 5 (FP5) for having given access to the data used in this paper.

Author contributions

K.K, M.S. and S.G. are jointly responsible for the ideas. S.H. and G.D. provided with the data for study 1b. K.K. conducted surveys for study 1a and 2 and realized the statistical analyses for all studies. K.K, M.S. and S.G. drafted the initial version of the manuscript for which S.H. and G.D. provided critical revisions. All authors approved the final version of the manuscript for submission. Portions of this work were presented by K.K. and S.G. at the 2017 General Meeting of the European Association of Social Psychology in Granada.

Abstract

Attitudes and social norms are key social psychological concepts that have often been considered as independent determinants of human behavior. However, questions about the interplay between the two are somewhat of a blind spot in social psychology. In the present research, we test the hypothesis that when an important change in norms is involved, behavioral intentions will be shaped by a discrepancy between personal attitudes and the perceived group norm, that is the perception of other group members' attitudes. This proposition is tested and supported across three studies in a context of the conversion to organic farming, a behavior indicative of a significant societal and behavioral change. Farmers who did convert to organic farming were those who perceive other farmers to hold less positive attitudes toward this environmentally-friendly practice compared to their own (Study 1a & 1b, N = 1023). Among conventional farmers, the intention to convert to organic farming is also predicted by a discrepancy between personal attitudes and the perceived group norm (Study 1b). Finally, among agricultural colleges' students (Study 2, N = 280), the intention to become an organic farmer was influenced by an interaction between attitudes and perceived group norm and not only by independent effects of these two variables. The theoretical and practical implications of these findings for a better understanding of behavioral adaptation in times of social change are discussed.

Keywords: attitudes, perceived group norm, counter-conformity, organic farming, theory of planned behavior, minority, social change

Making the Planet Green Again: The Interplay of Attitudes and Group Norms in the Conversion to Organic Farming

Global environmental issues, including problems related to climate change (United Nations, 2019), biodiversity conservation (Tschamntke et al., 2012), or urban pollution (Pascal et al., 2013), are among the greatest challenges facing the world today. It becomes increasingly clear that meeting these challenges will require drastic changes in our ways of living and behaving. Social psychological research is thus of great relevance to examine and understand the mechanisms that underlie such social and behavioral changes (Beedell & Rehman, 2000; Burton & Wilson, 2006; Swim et al., 2011). The present research addressed this question with regards to a change in current farming practices. In three studies, we examined the role of the interplay between attitudes and social norms in shaping the decision of farmers to switch from conventional to organic farming.

Organic Farming: A Major Change in Societal Practices

Current conventional farming practices rely on the use of pesticides and other carcinogenic substances that are directly and indirectly responsible for many short-term (e.g., health problems in the population) and long-term risks for the environment (e.g., pollution of rivers, decrease of the biodiversity, Pimentel, Hepperly, Hanson, Douds, & Seidel, 2005). As an alternative, organic farming (OF) has been developed since 1990s with its specific guidelines and requirements that aim at achieving a more sustainable farming and thus reducing the negative environmental impact of farming activity (European Union, 2019; Van Dam, Nizet, Dejardin, & Streith, 2009). However, according to recent data, the total area used for OF in Europe in 2017 represented only 7% of the total agricultural surface (European Commission, 2019). Thus, in comparison with conventional farming, OF is a minority mode of production and the conversion to this mode of farming represents both a societal and behavioral change.

Indeed, the conversion to OF represents not only a major change for the farmer and the farm itself (Sutherland, Burton, Ingram, Blackstock, Slee, & Gotts, 2012), but also a transformational adaptation of every dimension of the agricultural industry (Rickards & Howden, 2012; Van Dam et al., 2009). Furthermore, the conversion to OF implies that the farmers should reorganize their farm, learn alternative practices (Chantre, Cerf, & Le Bail, 2015) besides changing their worldviews and social networks (Barbier, Cerf, & Lusson, 2015; Sutherland et al., 2012). It also embodies a genuine social movement (Darnhofer, Lindenthal, Bartel-Kratochvil, & Zollitsch, 2010; O'Brien & Hochachka, 2010; Sutherland, Burton, Ingram, Blackstock, Slee, & Gotts, 2012) thus representing an important change in social and agricultural practices (see van Dam et al., 2009 for a discussion of the issue).

Previous research on farmers' changing practices has identified several important factors. The social concern, the concern for others, as well as being integrated in a social network (Sutherland et al., 2012; Tama, Ying, Yu, Hoque, Adnan, & Sarker, 2021; Zhang, Matous, & Tan, 2020) were shown to be strong predictors of farmers' intentions to change from conventional to organic farming (see Janjhua, Chaudhary, Mehta, & Kumar, 2019, for a review). Moreover, moral concerns and personal (pro-environmental) values were also shown to have an important impact on change of farming practices (Mzoughi, 2011; Sutherland & Darnhofer, 2012; Tama et al., 2021). In contrast, several technical (i.e., low financial and technical capacity of the farm) and professional constraints (i.e., lack of technical knowledge, reluctance to shift from chemical fertilizers and pesticides) of both farmers and their farms were shown to impede farmers from converting to OF (Janjhua et al., 2019). Finally, although economic factors have been largely studied especially at the beginning of the movement for OF (de Buck, van Rijn, Roling, & Wossink, 2001), they were often found of no greater importance than social and moral concerns (Deffuant et al., 2002).

To better understand the adoption of agricultural innovations, it appears that there is a need to further focus on both actor-oriented variables and social factors in the decision-making process in line with a “behavioral approach” (Burton, 2004). Drawing on theories of social behavior in social psychology, the present research was designed to test a new perspective on the dynamic interaction between personal attitudes and social norms in the explanation of farmers’ major change behaviors and intentions.

Attitudes and Norms: The Theory of Planned behavior

Attitudes and social norms are two key concepts in social psychology that have been shown to strongly predict individual behavior. However, few theories integrate both of these factors in their conceptual scheme. In mainstream social psychology, as it is presented in textbooks, attitudes and social norms are usually discussed and treated separately in different chapters. For instance, the Focus Theory of Normative Conduct (Cialdini, Reno, & Kallgren, 1990; Kallgren, Reno, & Cialdini, 2000) has developed the distinction between injunctive and descriptive norms but has yet to incorporate the concept of attitudes into its explanation of social behavior. The Theory of Planned Behavior (TPB, incorporating the theory of reasoned action, Ajzen, 1991; Fishbein & Ajzen, 1975) represents the major exception in that as it incorporates both attitudes and norms to explain and predict individual behavior. It postulates that both attitudes and subjective norm, along with perceived behavioral control (PBC), are the main determinants of individual behavior via their direct impact on behavioral intention (Ajzen, 1991). In this theory, attitude refers to the degree to which one has a positive versus negative evaluation with regards to performing a given behavior. Subjective norm is defined as a person’s belief about whether significant important others feel that there is an expectation to perform the given behavior. Finally, PBC reflects one’s perception of the ease or difficulty of performing the given behavior. Over the years, this theory has received a strong empirical support in research looking at numerous individual behaviors (see Armitage & Conner, 2001

for a meta-analytic review), ranging from leisure choice (Ajzen & Driver, 1992) to health behaviors (Conner, Sherlock, & Orbell, 1998), and including pro-environmental behaviors (de Leeuw, Valois, Ajzen, & Schmidt, 2015; Fielding, McDonald, & Louis, 2008).

TPB has also been used successfully in investigations of farmers' sustainable practices (Senger, Borges, & Machado, 2017; Tama et al., 2021) and notably their decisions to switch to OF (Issa & Hamm, 2017; Läßle & Kelley, 2013). In fact, from the perspective of TPB, the social and moral concerns identified above as being important to understand farmer's behaviors, as well as economic issues and values (e.g., expected outcomes), would all be conceived as having an effect that is filtered through the three main components of the theory (Ajzen, 1991). Thus, there is little doubt that this theoretical framework affords a powerful mean of understanding the conversion to OF (Senger et al., 2017) and the present research aims to provide a further comprehensive test of the effects of the main components of TPB on behavioral intentions to switch to OF. However, seeking to complement TPB, our main focus is also to outline important dynamic relations between attitudes and norms that can contribute to the explanation of behavior and that are not yet incorporated within TPB.

Indeed, TPB suggests that attitudes and subjective norms (as well as PBC) have essentially *independent* or additive effects on behavioral intentions (Ajzen, 1991; Grube & Morgan, 1990; Povey, Conner, Sparks, James, & Shepherd, 2000; Terry & Hogg, 1996; White, Hogg, & Terry, 2002). An alternative viewpoint suggesting that there are interactive effects between attitudes and norms on behaviors has however found some support (Grube & Morgan, 1990; Park & Smith, 2007). For instance, Park and Smith (2007) by demonstrating the conceptual and empirical differentiation between five different types of norms showed also that some of these norms moderated the effects of attitudes on behavioral intentions. The pattern of these interactions is generally in line with the "contingent consistency approach" (Acock & DeFleur, 1972; Bagozzi & Schneiditz, 1985; Grube & Morgan, 1990) according to

which the attitude is behaviorally supported when it is consistent with the norm. In other words, these results suggest that as the level of normative support increases, the power of attitudes to predict intentions also increases. Importantly, Grube and Morgan (1990) have shown that this perspective is well suited to explain current behavior but not behavioral change. Accordingly, we suggest that in times of social change, when people have to adapt to new conditions, the interaction between attitudes and norms would take the form of a mismatch, rather than a match to shape individual behaviors.

Mismatch Between Personal Attitudes and Perceived Group Norm

The impetus for raising questions about the interactive impact of attitudes and norms on social behavior comes from a series of investigations distinguishing between personal attitudes, the individual's personal evaluation of an attitude object, from the perceived group norm defined as the perception of the attitudes held by most group members (see de la Sablonnière et al., 2020; Guimond et al., 2013; 2014; 2015; Pelletier-Dumas, de la Sablonnière, & Guimond, 2017). It was repeatedly shown that measures of personal attitudes and perceived group norms were valid, and tapping empirically distinct constructs, even when the content of each measures was identical (except for the fact that the first measure refers to the self and the latter to the group). Moreover, whereas personal attitudes and perceived norms were sometimes very close and strongly related to each other, cases of a sharp discrepancy or a mismatch between personal beliefs and the perception of the beliefs held by other group members were also observed (see Guimond et al., 2014 for a discussion on the issue). In other words, some people may feel that their attitudes and that of other group members are in perfect match whereas others may experience a mismatch between the two referring to a feeling of a significant discrepancy between what they believe in and their perception of what most group members believe in (i.e., pluralistic ignorance, Prentice & Miller, 1993). Furthermore, and consistent with this view, it was recently shown that a

difference score computed by subtracting measures of perceived group norm from measures of personal attitudes correlated significantly, and negatively, with a measure of the perceived societal support for one's opinion ($r = -.43, p < .001, N = 546$, Authors, 2021).

Building on this work, in the present research we seek to test the behavioral effects of a mismatch between attitudes and perceived group norms. Indeed, when perceiving that one's attitude is different from that of other group members, people may adopt one of the two behavioral strategies. On the one hand, they can abandon their attitude and align it with the norm and thus conform to the majority opinion, as it may be assumed from conformity research (Asch, 1956; Noelle-Neumann, 1974/1993). On the other hand, individuals could also stand up for what they believe in although they consider the opinion as unpopular. For instance, Hornsey and collaborators have shown that individuals who have a strong moral basis for their attitude were more likely to publicly act out on their attitudes when they had normative opposition rather than when they had normative support (Hornsey, Majkut, & Terry, 2007; Hornsey, Smith, & Begg, 2003). However, the literature provides little guidance in understanding the conditions under which such a mismatch could have one of the above effects on one's behavior. In other words, what leads people to conform to the majority norm in one situation or march to the beat of their own drum in another? We suggest that when an important social and behavioral change is in perspective, such a self-other discrepancy may represent a basic motivational factor that leads to act in order to change the prevailing order of things.

It is worth noting that most of social psychological theories frame social influence under a conformity approach (Moscovici, 1976). For example, in TPB, people are assumed to conform to subjective norm in interpersonal relationships. However, a conformity approach seems to be ill-equipped to explain a change in social norms: if people always conform to current social norms, how can a change of norms occur? To understand the social change,

processes of minority influence (Moscovici, 1980) are central because by definition, innovation starts out among the few as opposed to the many (Lalot, Falomir-Pichastor, & Quiamzade, 2018; Mugny, Falomir-Pichastor, & Quiamzade, 2017). The fact that the practices are changing and increasing in prevalence might be indeed explained by the fact that active minority acts in line with their attitude by hoping to inspire and be followed by others to promote some changes within group norms (Moscovici, 1980). This perspective has received a robust confirmation in the social psychology of dissent by demonstrating the effect of minority support on one's intention to act in line with one's attitude (Jetten & Hornsey, 2014; Lalot et al., 2018; Mugny et al., 2017). For instance, when studying pro-environmental behaviors, Lalot and colleagues (2018) have shown that participants who perceived a minority support for their attitudes and behaviors were those who acted in line with their, perceived as unpopular, pro-environmental attitude. Indeed, when one's attitudes are perceived as not being shared by other group members, the need to "do something" in order to change the status quo and to articulate one's position publicly may be felt more acutely (see Hornsey et al., 2003; 2007; Lalot et al., 2018). Put differently, the minority support might have an energizing effect and make people feel more responsible to change things by engaging overtly in the actions that are in line with their opinions. Drawing on minority influence approach, we suggest that people who are at the vanguard of innovations may often be characterized by a mismatch between their attitudes and that of others (i.e., perceived norm): they are personally committed to a course of action that goes against prevailing social norms. In such cases, the influence of attitudes might be in a direction that is opposite to that of social norms, suggesting the possibility that behavior is shaped by an interaction between attitudes and norms.

The need for systematic research on the interactions between attitudes and social norms can be further illustrated by considering research conducted from a social identity

perspective (Hogg & Smith, 2007; Terry & Hogg, 1996). Noting that past research has often identified a relatively weak subjective norm-behavior link (Armitage & Conner, 2011; Manning, 2009; Ravis & Sheeran, 2003; Terry & Hogg, 1996), it was argued for the reconceptualization of a normative component within TPB (Ravis & Sheeran, 2003; Terry & Hogg, 1996). Indeed, TPB's original subjective norm refers to the influence of "close others" and focuses consequently on interpersonal influence (Manning, 2009; Terry & Hogg, 1996). From a social identity perspective, to shape one's behavior, norms should be defined in group terms and refer to the behavior of salient group members (Hogg & Smith, 2007; Terry & Hogg, 1996). Experimental research reviewed by Hogg and Smith (2007) indeed revealed that group norms had a greater impact on behavioral intentions especially when people identify strongly with the group. However, and despite the fact that the first sentence of Hogg and Smith (2007) is "Attitudes are windows on identity" (p. 89), none of the studies conducted within this research program has tested the interaction between attitudes and group norms in shaping intentions or behavior. Similarly, the work of Fielding et al. (2008) purporting to integrate TPB and social identity theory with regards to the development of sustainable agricultural practices found support for this integration in that variables from TPB (attitudes, perceived behavioral control) were significant predictors of intentions and variables from social identity theory (group identification, group norms) improved the prediction of intentions. Moreover, in Study 2, they found a significant group identification by group norms interaction on intentions. However, again, the critical attitude by group norm interaction on behavioral intention was never tested by Fielding et al. (2008). Thus, applied to the societal change embodied by the conversion to OF (Van Dam et al., 2009), the present research was designed to fill this gap by offering systematic tests of such interaction effects on behavior itself, by contrasting farmers who did convert to OF with those who did not, and on behavioral intentions to switch to OF.

Overview of the Current Studies

The present research investigated the factors that are important to explain a significant behavioral change among farmers: the adoption of organic farming. Following TPB, the effects of its main predictors (attitudes, subjective norms, perceived behavioral control) were all expected to significantly determine farmers' intention to convert to OF. Moreover, besides these factors and given the need for more group-based definition of the norms (Terry & Hogg, 1996), the effects of norms of behaviorally relevant groups (i.e., other farmers of the region or country), that are the perceived group norm (i.e., the perceived attitudes of other farmers) were also examined. Based on our reasoning above, our main hypothesis was that attitudes would interact with the perceived group norms in shaping farmer's behaviors, and in predicting their intention to convert to OF.

Three studies were conducted to examine these hypotheses using both measures of behavior and behavioral intentions. In all studies, given that OF involves a change in norms and behaviors, we sought to test the hypothesis that perceiving one's own attitude toward conversion to OF as being different from that of a majority of farmers would be associated with an increased intention to convert to OF (i.e., mismatch hypothesis).

In Study 1a (pilot study), a small sample of French conventional and organic farmers ($N = 32$) was surveyed. Study 1b aimed to replicate the findings of Study 1a within a large sample of East-European farmers ($N = 973$). Across both studies, we first examined the prediction that the attitude/group norm mismatch varies as a function of the actual behavior of the participants, that is their actual farming practice (organic or conventional). Moreover, among conventional farmers in study 1b ($N = 566$), the effects of such a discrepancy were examined on their intention to convert to OF. In order to examine the robustness of our mismatch hypothesis, this study also aimed at testing TPB's main predictors as well as interactions between attitudes and subjective norms in relation to farmers' intention to convert

to OF. Finally, in Study 2, the interaction between attitudes and perceived group norm was examined with regards to its effects on agricultural high school students' intention to become organic farmers.

Study 1a (Pilot study)

Study 1a was designed as a pilot study to provide a preliminary evidence for the mismatch hypothesis using as behavioral criterion farmers' actual farming practice (organic versus conventional). We expected that organic farmers should display a greater mismatch between their personal attitudes and perceived group norm related to the OF compared to those who did not convert to OF.

Method

Participants. 32 French farmers were recruited during the European livestock show held in a middle-sized French city. The sample consisted of 21 men and 11 women aged from 24 to 64 years ($M_{age} = 44.8$ years, $SD_{age} = 12.3$). Among these 32 farmers, 10 of them were adopters of organic farming.

Measures. Participants were asked to complete a questionnaire assessing social psychological constructs as well as a set of questions about their farm business (i.e., farming practices, livestock management, etc.) and socio-demographic questions¹.

The measures of personal attitudes and perceived group norms were developed for the purposes of the present study, inspired by Guimond et al. (2013). On the basis of an exploratory factor analysis showing a two-factor structure and consequent reliability analyses, a four-items scale of personal attitudes (e.g., "The practice of organic farming is desirable for the future of the region", $M = 3.63$, $SD = 1$, $\alpha = .77$) and a four-items scale of perceived group norm (e.g., "Farmers think that the practice of organic farming is desirable for the future of the region", $M = 3.34$, $SD = .94$, $\alpha = .76$) were constructed, both scales are strongly correlated, $r = .86$, $p < .001$ (see also Guimond et al., 2013; 2015). It is worth noting, that to

assess the perception of other farmers' attitudes, participants were specifically instructed to indicate whether the views expressed in a series of statements were "commonly held among farmers". For both measures, participants answered on a 5-point scale (1 = *absolutely disagree* and 5 = *absolutely agree*).

Results

Attitudes and Perceived Group Norm: A Significant Mismatch

To examine the differences between personal attitudes and perceived group norms as function of farming practices, a 2 x 2 (Agricultural practice [conventional farmers, organic farmers] x Type of measure [personal attitude, perceived norm]) repeated measures ANOVA with the second variable as a within-participants measure was conducted. Results revealed a significant effect of the type of measure, $F(1, 30) = 5.60, p = .025, \eta_p^2 = .157$, yielding a significant difference between attitudes and perceived group norm. Farmers seem perceiving their attitudes ($M = 3.63, SD = 1$) as being different from that of other farmers of their region ($M = 3.34, SD = .94$). As predicted, the interactive effect between the farming practice and the type of measure was also significant, $F(1, 30) = 4.57, p = .041, \eta_p^2 = .132$, showing that such perceived difference between attitudes and group norms varied significantly as a function of farmers' actual practice. As displayed in Figure 1, a mismatch between farmers' personal attitudes and their perception of other farmers' attitudes was significant only among organic farmers (mean difference = .83, $p = .011, \eta_p^2 = .197$), whereas it was not significant among conventional ones ($p = .840$).

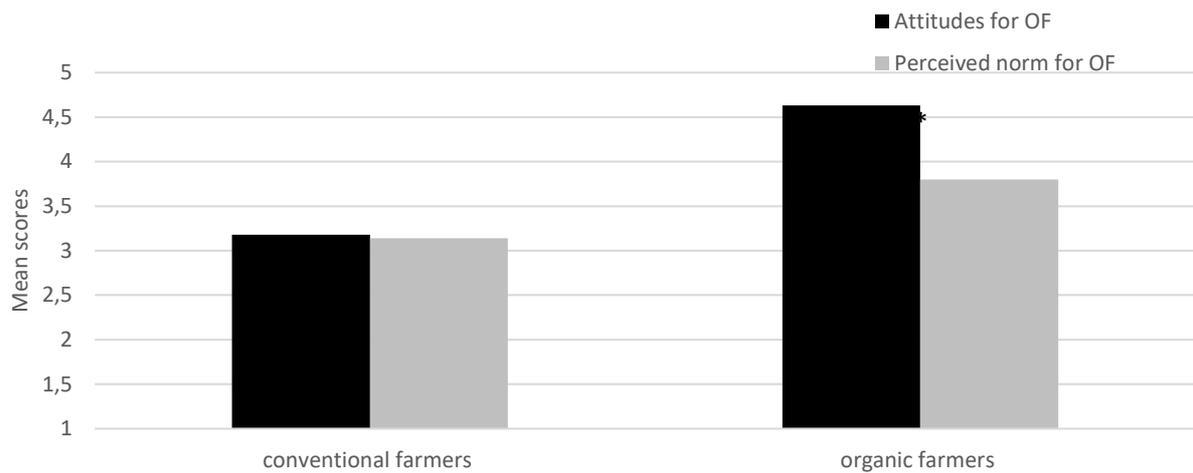


Figure 1. Farmers' mean scores of personal attitudes toward the organic farming (OF) and perceived norm of OF as a function of their farming practice (Study 1a).

* $p < .05$

Study 1b

Study 1a yielded a preliminary evidence suggesting that organic farmers were more likely than conventional farmers to be characterized by a significant discrepancy between their attitudes and their perception of other farmers' attitudes with regards to organic farming. However, given a small sample size, this evidence might be misleading. Thus, Study 1b tested this hypothesis with data from a large-scale survey conducted in a different, East European, context (Open Science Collaboration, 2017). Accordingly, we first expected organic farmers to perceive a greater discrepancy between their attitudes and the group norm in comparison with conventional ones. Moreover, if our reasoning on the role of a discrepancy between personal attitudes and perceived group norms in farmers' conversion to OF is correct then it should be related to conventional farmers' intention to switch to OF to a greater extent than a match between the two. Consequently, we predicted a significant Attitude X Perceived group norm interaction on conventional farmers' intentions to convert to OF. It is worth noting that the said discrepancy may reflect a positive attitude combined with a negative perceived norm and vice versa. However, given that according to TPB the attitude should be positive to have a positive effect on intention (Ajzen, 1991) and the minority influence perspective supposes that one's intention is more likely to be expressed when it is supported by the minority (Lalot

et al., 2018), the suggested discrepancy is expected to take form of a positive attitude and negative norm to predict farmers' intention to convert to OF. In other words, conventional farmers who perceive that their personal attitudes are more positive than that of other farmers should be more likely to intend to switch to organic farming (intention in line with their attitude) than those whose attitudes match the perceived norm. A second goal of Study 1b, of a more exploratory nature, was to explore the extent to which our mismatch hypothesis remains valid by considering other variables known to predict behavior such as perceived behavioral control (PBC). More specifically, given the significant effects of PBC in determining individual intentions and behaviors in general (Ajzen, 1991) and pro-environmental behaviors in particular (de Leeuw et al., 2015; Fielding et al., 2008), the Attitude x Perceived norm interaction was tested by controlling for this factor. As the conversion to OF involves an important technical change in farmers' everyday practices (Chantre, Cerf, & Le Bail, 2015), the perception of ease or difficulty to convert might be a moderator of interactive effects between attitudes and perceived group norms on intention. Indeed, one might speculate that the mismatch would have a stronger effect for those who feel prepared or perceive that the conversion is easy to enact in contrast to those who perceive a low control over that behavior.

Finally, Study 1b examined the role of three main variables predicting intention according to TPB in order to show that the above mismatch hypothesis complements rather than contradicts TPB. Following TPB, having a positive evaluation of the conversion to OF (positive attitudes), perceiving that significant others are favorable to OF (positive subjective norm) and believing that one can be successful in converting to OF (high perceived behavioral control) are all expected to predict the intention to switch to OF. Moreover, an eventual attitude by subjective norm interaction was also examined on intention to convert to

OF. In line with a large body of research testing TPB, we did not expect this interaction to have a significant effect on the behavioral intention (see also Terry & Hogg, 1996).

Method

Participants. Data in this study come from 1081 persons who participated in a large research program on “Integrated Development of Agricultural and Rural Institutions” (IDARI)². This study was conducted in six countries: Estonia ($N = 187$), Hungary ($N = 182$), Latvia ($N = 170$), Lithuania ($N = 193$), Poland ($N = 192$) and Slovenia ($N = 157$). Among 1081 participants, 108 were farm managers and 973 were farmers. As the principal goal of the present study was to examine farmers’ intentions to switch or not to organic farming, the analyses presented below were conducted exclusively on the sample of 973 farmers. The final sample consisted of 297 females and 676 males aged from 22 to 83 years ($M_{age} = 49.48$, $SD_{age} = 11.77$). 566 participants were conventional farmers, and 407 were organic farmers.

Measures. Participants were asked to complete a survey that included a set of general questions about their farm business (e.g., farming practices, land and livestock management, etc.) along with a set of questions about the personal attitudes, perceived and subjective norms and some other psychological and personality variables. All measures presented below, except for the perceived group norm, are assessing the basic determinants of social behavior following the standards recommended by TPB (Ajzen, 2002).

Personal attitudes. Respondents’ personal attitudes toward organic farming were assessed using eleven items (e.g., “Compared to conventional farming, organic farming leads to healthier livestock”; 1 = *extremely unlikely* and 7 = *extremely likely*; $M = 5.19$, $SD = .86$, $\alpha = .81$).

Perceived group norm. One item assessed the perceived group norm: “Which opinion do the majority of farmers have about organic farming?” (1 = *extremely bad* and 7 = *extremely good*; $M = 4.16$, $SD = 1.31$).

Subjective norm. Six questions assessed subjective norm (e.g., “My spouse/domestic partner thinks I [1 = *should not* and 7 = *should*] convert to organic farming”; $M = 4.28$, $SD = 1.34$, $\alpha = .86$).

Perceived behavioral control (PBC). Perceived behavioral control was assessed with six items (e.g., “I have all farming skills required for converting to organic farming”, or “Currently I could financially afford to convert to organic farming”; 1 = *absolutely disagree* and 5 = *absolutely agree*; $M = 3.77$, $SD = 1.23$, $\alpha = .79$).

Behavioral intention. Farmers’ intention to switch to OF was measured through three strongly correlated items (“I plan to carefully monitor (read, discuss, etc.) “organic farming” as a possible alternative to conventional farming over the next ten years”, “What is the likelihood of you having a farm appraisal for investigating “organic farming” as a possible alternative to conventional farming over the next ten years?”, and “What is the likelihood of you converting to organic farming within the next ten years?”; 1 = *extremely unlikely* and 7 = *extremely likely*, $M = 3.68$, $SD = 1.80$, $\alpha = .93$).

Results

Since personal attitudes and perceived group norm were significantly correlated ($r = .19$, $p < .001$, see Table 1 for descriptive statistics within overall sample) and the interaction between the two is of our main interest, tests examining possible problems of multicollinearity were conducted. With our data, the Tolerance value is .81 and Variance Inflation Factor (VIF) is 1.26, indicating the absence of problem of multicollinearity between these two variables (Field, 2013).

Table 1

Descriptive Statistics for Tested Variables (Means, Standard Deviations and Bivariate Correlations) Among Conventional and Organic Farmers, Study 1b

Variable	M (SD)	1	2	3	4	5
1. Personal attitudes	5.19 (.86)	-				
2. Perceived norm	4.16 (1.31)	.19***	-			
3. Perceived behavioral control ^a	3.77 (1.23)	.21***	.05	-		
4. Subjective norm ^a	4.28 (1.34)	.46***	.17***	.44***	-	
5. Behavioral intention ^a	3.68 (1.80)	.35***	.14***	.51***	.59***	-

Note. $N = 973$. OF = organic farming.

^a $N = 566$ (conventional farmers only)

* $p < .05$. *** $p < .001$.

Attitudes and Perceived Group Norm: A Significant Mismatch

Firstly, to examine the differences between personal attitudes and perceived group norms as function of farming practices, a 2 x 2 (Agricultural practice [conventional farmers, organic farmers] x Type of measure [personal attitude, perceived norm]) repeated measures ANOVA with the second variable as a within-participants measure was conducted. As in study 1a, the results yielded a significant effect of the type of measure, $F(1, 970) = 551.23$, $p < .001$, $\eta_p^2 = .362$, indicating a significant difference between attitudes and perceived group norm. Overall, farmers perceived their attitudes ($M = 5.19$, $SD = 0.86$) as being different from that of other farmers ($M = 4.16$, $SD = 1.30$). More importantly, and as predicted, there was a significant interaction effect between type of measure and agricultural practice, $F(1, 970) = 27.00$, $p < .001$, $\eta_p^2 = .027$, showing that this mismatch varied as a function of agricultural practice. The difference between personal attitudes and perceived norm was larger for organic

farmers (mean difference = 1.31, $p < .001$, $\eta_p^2 = .267$) than for conventional farmers (mean difference = 0.83, $p < .001$, $\eta_p^2 = .171$).

Can the Interaction between Personal attitudes and Perceived Group Norm Predict the Intention to Switch to Organic Farming?

We hypothesized that personal attitudes would interact with the perceived group norm in predicting the intention of conventional farmers to convert to OF (mismatch hypothesis). Moreover, we argued that this prediction is not necessarily incompatible with TPB but complementary to it. In order to test this position, two sets of multiple linear regression analyses were conducted. In the first one, the main and interactive effects between personal attitudes and perceived group norm were examined on farmers' intention to switch to OF while controlling for PBC (see Muller et al., 2008). This analysis was conducted using data from conventional farmers only ($N = 566$, see Table A1 for descriptive statistics for this subsample). This first model included personal attitudes, perceived group norm (both mean-centered) and their interaction (based on mean-centered scores, Aiken & West, 1991; Field, 2013). In addition, PBC (mean-centered) was entered as a control variable³. Since PBC was significantly related to personal attitudes ($r = .24$, $p < .001$), and main and interactive effects between attitudes and perceived group norms were of our main interest, all two- and three-way interactions were included in the final model (see Muller et al., 2008 for an analysis of the logic behind such adjustments). To summarize, farmers' intention to switch to OF was regressed on the model that included: attitudes, perceived norm, their interaction, PBC, PBC x Perceived norm, PBC x Personal attitudes interactions, and a three-way interaction Attitudes x Perceived norm x PBC. The results of this regression analysis using farmers' intentions to convert to OF as the dependent variable are displayed in Table 2. The overall model provided a highly significant prediction of farmers' intentions to convert to OF, $F(7, 547) = 36.45$, $p < .001$, $\eta_p^2 = .318$, $R^2_{adj} = .309$.

Table 2

Multiple Linear Regression Predicting Behavioral Intention From Personal Attitudes, Perceived Group Norm and Perceived Behavioral Control (Study 1b)

Predictor	<i>B</i>	<i>ES</i>	<i>t</i>	η^2_p
Attitudes	.48	.08	6.45***	.071
Perceived norm	.05	.06	.85	.001
PBC	.62	.06	11.26***	.188
Attitudes x Perceived norm	-.13	.06	-2.27*	.009
Attitudes x PBC	.05	.06	.85	.001
Perceived norm x PBC	.01	.05	.15	< .001
Attitudes x Perceived norm x PBC	.08	.05	1.86 ^t	.006

$$F(7, 547) = 36.45, p < .001, \eta^2_p = .318, R^2_{adj} = .309.$$

Note. PBC = Perceived Behavioral Control.

^t $p < .10$. * $p < .05$. *** $p < .001$.

The results yielded main effects of attitudes, $B = .48$, $t(547) = 6.45$, $p < .001$, $\eta^2_p = .07$, and PBC, $B = .62$, $t(547) = 11.26$, $p < .001$, $\eta^2_p = .188$, in that more positive attitudes toward OF and high level of PBC were associated with an increased intention to convert to OF. The main effect of perceived group norm was not significant, $B = .05$, $t(547) = .85$, $p = .393$, $\eta^2_p = .001$.

As predicted, the interactive effect between attitudes and perceived group norm was significant on behavioral intention, $B = -.13$, $t(547) = -2.27$, $p = .023$, $\eta^2_p = .009$. This interaction was then decomposed to examine the main effect of perceived group norm on intention among farmers with negative (-1 *SD* below the mean) and positive attitudes ($+1$ *SD* above the mean). Among farmers with negative attitudes, the perceived group norm was positively associated with their intention to switch to OF, $B = .70$, $t(547) = 2.36$, $p = .019$, $\eta^2_p = .010$. More importantly and as predicted, among farmers with positive attitudes toward OF, a perception of other farmers being opposed to OF was associated with their increased

intention to switch to OF, $B = -.60$, $t(547) = -2.11$, $p = .036$, $\eta^2_p = .008$. As displayed in Figure 2, the discrepancy between farmers' personal (positive) attitudes and their perception of other farmers' attitudes (i.e., negative) regarding the conversion to OF is associated with their increased intention to switch to OF in contrast to the match between the two (i.e., both positive).

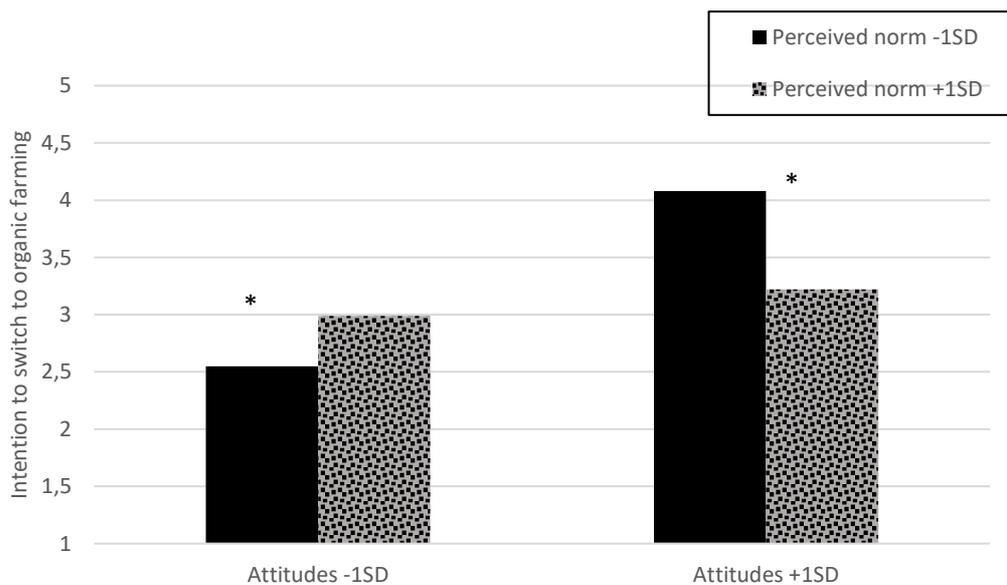


Figure 2. Interactive effects between personal attitudes and perceived group norm on conventional farmers' intention to switch to organic farming (Study 1b). SD = Standard Deviation.

* $p < .01$

Finally, a three-way interaction between attitudes, perceived group norm and PBC was marginally significant, $B = .08$, $t(547) = 1.86$, $p = .063$, $\eta^2_p = .006$. Simple slopes were tested by examining the effects of Attitude x Perceived Norm interaction for farmers with low (-1SD) and high (+1SD) level of PBC. Surprisingly, this two-way interaction between attitudes and perceived norm was significant only for conventional farmers with a low level of PBC, $B = -.45$, $t(547) = -2.48$, $p = .013$, $\eta^2_p = .011$, but not for those with a high level of PBC, $B = .18$, $t(547) = 1.03$, $p = .304$, $\eta^2_p = .002$. Among the farmers with low level of PBC and who have negative attitudes, the perceived group norm was positively associated with their intention to switch to OF, $B = 2.21$, $t(547) = 2.39$, $p = .017$, $\eta^2_p = .010$. However, among

farmers with positive attitudes, the perception of the norm being opposed to OF (i.e., mismatch) was associated with a greater intention to switch to OF than the perception of the positive norm (i.e., match, $B = -2.17$, $t(547) = -2.46$, $p = .014$, $\eta^2_p = .011$, see Figure A1 in Appendices).

Can the Interaction between Personal attitudes and Subjective Norm Predict the Intention to Switch to Organic Farming?

A second multiple linear regression was conducted to examine the main and interactive effects between TPB's main predictors that are attitudes, subjective norm and PBC on behavioral intention. As for the previous analyses, PBC was entered as a covariate. Since PBC was significantly related to personal attitudes ($r = .19$, $p < .001$) and subjective norm ($r = .42$, $p < .001$) and since we were interested in main and interactive effect between attitudes and subjective norm on intention, all two- and three- way interactions between these three variables were also entered in the analyses (Muller et al., 2008). To summarize, farmers' intention to switch to OF was regressed on the model that included: attitudes, subjective norm, their interaction, PBC, PBC x Subjective norm, PBC x Personal attitudes interactions, and Attitudes x Subjective norm x PBC (overall model: $F(7, 547) = 59.06$, $p < .001$, $\eta^2_p = .430$, $R^2_{adj} = .423$).

Consistent with TPB, and as shown in Table 3, attitudes, $B = .25$, $t(547) = 3.19$, $p = .002$, $\eta^2_p = .018$, subjective norm, $B = .57$, $t(547) = 10.66$, $p < .001$, $\eta^2_p = .172$, and PBC, $B = .43$, $t(547) = 8.27$, $p < .001$, $\eta^2_p = .111$, were shown to be significant predictors of conventional farmers' intention to switch to OF. As expected, the Attitude x Subjective norm interaction on intention was not significant, $B = -.05$, $t(547) = -1.07$, $p = .284$, $\eta^2_p = .002$. All two- and three-way interactions did not reach a significance, all $ps < .274$.

Table 3

Multiple Linear Regression Predicting Behavioral Intention From Personal Attitudes, Subjective Norm and Perceived Behavioral Control, Study 1b

Predictor	<i>B</i>	<i>ES</i>	<i>t</i>	η^2_p
Attitudes	.25	.08	3.19**	.018
Subjective norm	.57	.05	10.66***	.172
PBC	.43	.05	8.28***	.111
Attitudes x Subjective norm	-.05	.05	-1.07	.002
Attitudes x PBC	.06	.06	1.09	.002
Subjective norm x PBC	-.01	.04	-.09	<.001
Attitudes x Subjective norm x PBC	-.01	.03	-.28	<.001

Overall model: $F(7, 547) = 59.06, p < .001, \eta^2_p = .430, R^2_{adj} = .423$

Note. PBC = Perceived Behavioral Control.

* $p < .05$. ** $p < .01$. *** $p < .001$

Discussion Study 1a & Study 1b

These first two studies aimed at testing the role of the mismatch between personal attitudes and perceived group norm in the determination of conventional farmers' intention to switch to organic farming (mismatch hypothesis). Across various cultural and geographical contexts, both studies confirmed our expectations using the behavioral criterion of farmers' actual farming practices. Organic farmers were more likely than conventional farmers to perceive a significant discrepancy between their attitudes and perception of that of other farmers to greater extent than conventional ones, the finding being replicated across two studies. Moreover, Study 1b confirmed our main mismatch hypothesis and showed that such a mismatch was significantly associated with the increased intention to switch to organic farming in contrast to the match between the two. Thus, these findings point to the fact that the interaction between one's attitudes and the perceived group norm can be an important psychological process underlying an individual's behavior.

Furthermore, when using a classical TPB framework, we found a strong support for its main components as being independent predictors of behavioral intention with the effect sizes for these effects being stronger than for that of model including perceived group norm. However, whereas the subjective norm was found to have a strong main effect on intention, it is not found to have interactive effect with personal attitude on behavioral intention, as it is the case for perceived group norm. Thus, our data points on the necessity to consider the perception of attitudes of wider group (i.e., perceived norm) and not only that of important others (i.e., subjective norm) when it comes to explain a behavioral change.

Moreover, as expected, this interaction that takes form of a discrepancy between the two appears to be one of the factors underlying counter-conformity behavioral pattern, especially in times of social change, as that involved in conversion to OF. Conventional farmers perceiving their attitude being different from that of majority report an enhanced intention to convert to OF (minority intention consistent with their attitude) probably to spur others to change the prevailing mode of farming that is conventional agriculture.

An alternative explanation of this counter-conformity pattern found among conventional farmers with positive attitude toward OF might lie in the strength and certainty of that attitude. In other words, they might express their attitude although perceived unpopular because they are strongly convinced of that. However, Hornsey et al. (2003) have no found support for the effect of the attitude strength in counter-conformity effect.

Yet, the unexpected but thought-provoking result on the moderating role of PBC might offer another possible explanation of this resistance to the group norm among farmers who report converting to OF. In fact, farmers with low – rather high as predicted- level of PBC having indicated the increased intention to convert suggest that other than technical and economic factors might be at play in the decision-making process. In other words, the moral component of the attitude might eventually play an important role in the explanation of the

counter-conformity effect that seems override group identity concerns (e.g., fear of being excluded from the group) and other technical and economic constraints (e.g., fear to fail with OF) when it comes to act. The literature on the motivations underlying conventional and organic farmers' choice of practices seems support such possibility. For instance, it was shown that organic farmers, in contrast to conventional ones, are more concerned by the moral and environmental issues related to organic farming (Flaten et al., 2005; Janjhua et al., 2019; Läßle, 2013). Thus, one may suppose that the motivation to engage in organic mode of farming can be driven mostly by such "moral" versant of this agricultural practice (e.g., sustainability of biodiversity and soils, taking care of animal and human well-being, etc.). Consequently, this moral base of the attitude among the future organic farmers may override more economical and practical aspects of converting to more environmentally friendly farming and/or group identity concerns. Furthermore, previous research on the social psychology of dissent has successfully confirmed that the moral basis of one's attitude could enable people to resist to the prevailing norm of the group or normative opposition to their attitude (Hornsey et al., 2003; 2007). Although such possibility seems plausible, we should be cautious in interpreting this unexpected and marginal effect and the moderating role of the moral basis of the attitude should be further examined in future studies.

The moderating effect of PBC observed in Study 1b might also suggest that the effect of the mismatch on behavioral intention might occur very early in the decision process, when people have little basis to appraise their ability to conduct the change and low knowledge and perception of the control over such a change (low perceived behavioral control).

Consequently, to test such suggestion, Study 2 was conducted among young students pursuing an agricultural program before they are actually engaged in their professional agricultural practice. Moreover, it should be noted that the measure of perceived group norm used in study 1b was a single item scale in contrast to four-items scale used in study 1a thus

eventually raising some concerns of consistency of the behavioral intention measure across these two studies. This limitation was addressed in study 2 by measuring perceived group norms through a scale with several items. In line with the assumption that the mismatch would be one of the eventual factors being at the origins of the adoption of a new course of action rather than a simple consequence of one's farming practice, we expected such a mismatch to predict future farmers' intention to become an organic farmer.

Study 2

In contrast to Study 1, Study 2 was not conducted among actual farmers but among students pursuing an agricultural program, that is before they are actually engaged in their professional agricultural practice. With regard to behavioral change in the environmental domain, young people are a critical stakeholder since they bear the burden of past and current negligence toward the environment. At the same time, they represent a powerful engine for behavior change. Thus, studying their pro-environmental implication and intentions is an important area of concern that has practical applications for creating a sustainable future (see also de Leeuw et al., 2015). As for the precedent studies, an Attitudes x Perceived norm interaction was expected on agricultural high school students' intention to become an organic farmer. Notably, we expected that students who are personally favorable to organic farming but simultaneously perceive other members of their group as being less favorable to that (i.e., mismatch hypothesis) would report a greater intention to become an organic farmer in the end of their studies.

Method

Participants. 280 students from seven agricultural institutes and colleges of a French region participated in the present study. Two of these institutions were agricultural technical institutes and students from them were excluded from the analyses as their educational background consists rather in engineering courses and not properly farming ones as it is the

case of other five high schools. The final sample of 215 consisted of 158 boys and 56 girls (with one participant who did not indicate his gender), aged between 15 and 23 years old ($M_{age} = 17.61$, $SD = 1.57$). Before the proper experience took place, parents of underage students were asked to complete the consent form authorizing the participation of their children in the present study. Those students who did not provide the consent form signed by their parents were not authorized to participate in the survey.

Measures. The questionnaires were distributed to students during their classes.

Personal attitudes. Eleven items assessed students' personal attitudes toward organic farming (e.g., "Organic farming practices are desirable for the region's future", $M = 3.34$, $SD = .76$, $\alpha = .86$, three reversed items).

Perceived group norm. To address the methodological limitation of Study 1b where the perceived norm was measured via single item, in the present study this construct was assessed by transforming the personal attitudes scale into measures of the perception of others' attitudes by adding the phrases such as "Most farmers believe that..." at the beginning of each item (e.g., "Most farmers believe that organic farming practices are desirable for the region's future", 9 items, $M = 2.96$, $SD = .60$, $\alpha = .72$, three reversed items). Moreover, participants were specifically instructed to indicate whether the views expressed in these statements were "commonly held in agricultural domain today"⁴. All these variables were assessed through a 5-point scale (1 = *strongly disagree* and 5 = *strongly agree*).

Behavioral intention. Finally, students' intention to become an organic farmer in the end of their studies, our behavioral intention, was assessed via categorical yes/no answer question "If you have an occasion, would you like to become organic farmer?". 58.6 % of students ($N = 124$) indicated that they do not want to become an organic farmer compared with 37.7 % ($N = 81$) who said yes.

Results

Personal Attitudes and Perceived Group Norm: A Significant Mismatch

Firstly, to explore differences between attitudes and perceived norms as a function of students' intention to become an organic farmer, a 2 x 2 (Intention to become an organic farmer [yes, no] x Type of measure [personal attitudes, perceived norm]) repeated measures ANOVA with the second variable as a within-participants measure was conducted. Results revealed a significant effect of type of measure, $F(1, 204) = 107.71, p < .001, \eta^2_p = .346$, yielding a significant mismatch between attitudes and perceived group norm. Students perceived their attitudes toward OF ($M = 3.34, SD = .76$) as being different from that of other students ($M = 2.96, SD = .60$). Moreover, interactive effect between type of measure and intention to become an organic farmer was also significant, $F(1, 204) = 22.48, p < .001, \eta^2_p = .099$, showing that this perceived difference significantly varied as function of students' intention to become an organic farmer. As displayed on Figure 3, a perceived discrepancy between attitudes and perceived group norm was larger among students indicating the intention to become an organic farmer (mean difference = .63, $p < .001, \eta^2_p = .314$) than among those who did not (mean difference = .23, $p < .001, \eta^2_p = .091$).

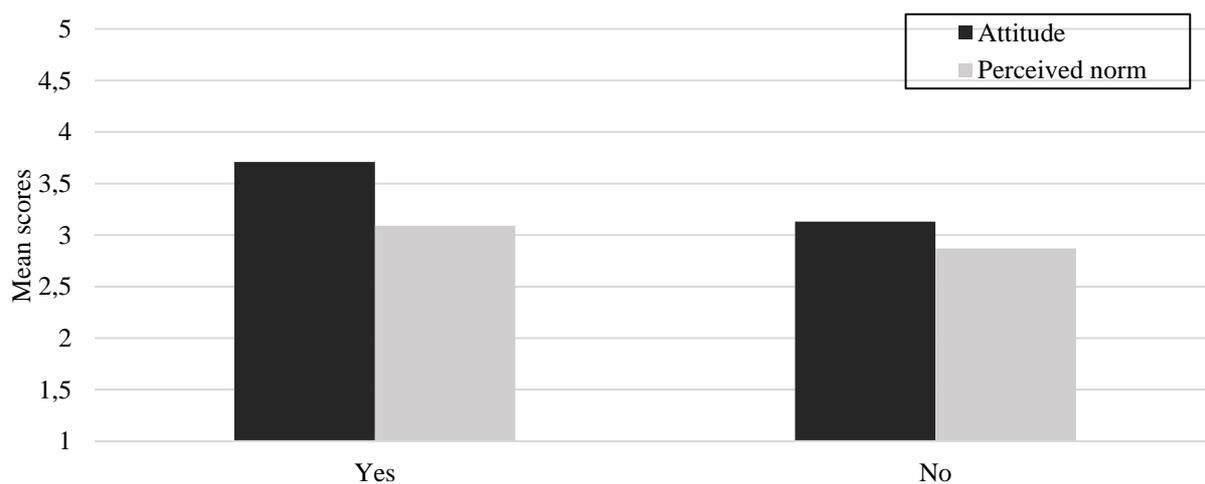


Figure 3. Mean scores of personal attitudes and perceived group norm toward organic farming as function of students' intention to become an organic farmer (yes, no), Study 2. *** $p < .001$

Could a Mismatch between Personal Attitudes and Perceived Group Norm Predict Students' Intention to Become an Organic Farmer?

In order to test the effects of mismatch between attitudes and perceived norm on the intention to become an organic farming (dichotomous variable; yes coded 0 and no coded 1), logistic regression was performed where the latter was predicted from personal attitudes (mean centered) and perceived group norm (mean centered). As predicted, the model accounting for additive (attitudes, perceived norm) and interactive effect fitted well our data, $\chi^2(3) = 39.93, p < .001$.

This analysis yielded a significant effect of attitudes, $B = -1.41, Wald = 21.30, p < .001, OR = .24$, in that positive attitudes toward organic farming were strongly associated with an increased probability of students' intention to become an organic farmer. The perceived norm was not significantly associated with the intention to become an organic farmer, $B = .14, Wald = .14, p = .713, OR = 1.15$. As predicted, interactive effect between attitudes and perceived group norm was significant on behavioral intention, $B = .72, Wald = 4.01, p = .045, OR = 2.05$. Simple slope analyses revealed that among students who perceived the norm being negative toward the organic farming, their positive attitude was associated with an increased intention to become an organic farmer (i.e., mismatch, $B = -1.84, Wald = 22.57, p < .001, OR = .16$). Among students who perceived the norm being positive toward OF, the effect of attitude was also positively related, although less strongly, to the intention to become an organic farmer, $B = -.98, Wald = 7.45, p = .006, OR = .37$.

Discussion

The mismatch hypothesis was replicated among agricultural colleges students. This study confirmed our main expectations in a way that the mismatch between attitudes and perceived norm was significantly related to students' self-reported intention to become an organic farmer. In other words, students who had positive attitudes toward organic farming but who perceived others being opposed (i.e., mismatch) to it reported a stronger intention to become an organic farmer in the end of their studies. These results are consistent with the

findings of Study 1b in which a significant interactive effect between attitudes and perceived norm on intention was observed especially among low PBC farmers. Indeed, the students of agricultural schools who do not have a necessary behavioral control over their farming practice since they are not yet farmers (they do not yet have a specific knowledge and skills necessary for conversion to OF) displayed the counter-conformity behavior associated with a mismatch, as low PBC farmers did.

Overall, study 2 demonstrated an important role that interaction between personal and social factors could play in the determination of high school students' pro-environmental behavior besides the principal components of TPB (see de Leeuw et al., 2015). The fact that the same behavioral effects of mismatch were found among the future farmer generation indicates that a counter-conformity process associated with such a mismatch does not seem to be a simple rationalization for one's farming practice but rather be at the origins of the proper decision to switch to organic farming. However, the categorical measure of intention to become an organic farmer might not capture all the tonality of such a complex behavioral intention. Thus, future studies should benefit from continuous measure of this variable as well as from the longitudinal study design to confirm the behavioral pattern of such a mismatch phenomenon.

General discussion

Attitudes and norms are considered as being independent determinants of one's behavior according to the Theory of Planned Behavior (TPB; Ajzen, 1991; Terry & Hogg, 1996). In the present research, we proposed that the interaction between personal attitudes and perceived group norms (i.e., individual perception of attitudes of other group members, Guimond et al., 2013) might indeed explain individual behavioral change especially when an eventual social change is involved. This assumption was tested in the agricultural context of organic farming (OF) that is a minority mode of farming and the conversion to that reflects an

important change in farming actual norms (Van Dam et al., 2009). Expanding the TPB and drawing on minority influence approach (Moscovici, 1980; Mugny et al., 2017), across these three studies, the mismatch between conventional farmers' personal attitudes and their perceptions of other farmers' attitudes regarding the OF was suggested to be associated with an increase in their intention to switch to organic farming (mismatch hypothesis).

Our findings across three studies conducted within different farming and geographical contexts and among different populations confirmed our expectations, giving evidence for an overall significant Attitude x Perceived norm interaction on behavior and behavioral intentions. First, in Study 1, it was found that among all farmers, organic farmers were more likely than conventional ones to perceived such discrepancy between what they personally think and their perception of what other farmers of their region or country think about OF. Moreover, study 1b showed that among conventional farmers, such a mismatch was shown to be predictive of their intention to switch to OF. In other words, conventional farmers who perceived a significant discrepancy between their attitude toward OF and that of other farmers (i.e., mismatch) reported a stronger intention to switch to an organic mode of production than those who perceived their attitudes matching that of others. Finally, in Study 2, a perceived discrepancy between attitudes and group norm was related to agricultural high school students', thus future farmers', choice of organic farming practices. Accordingly, this last study, conducted among individuals who are future farmers, indicated that a mismatch phenomenon may be at the origins of the conversion to organic mode of farming, actually a minority behavioral option, and not simply its consequence.

These results are interesting to be considered first from a theoretical perspective as they offer a new way to explain individual behavior in times of social change. Indeed, to predict individual behavior the previous research has mainly considered the independent effects of attitudes and norms (e.g., TPB, Ajzen, 1991; Terry & Hogg, 1996). In the present

research we argued that an interaction between the two might also determine the behavior, especially the social change behavior. Furthermore, our findings are not necessarily incompatible with TPB, since Study 1b provided a support for significant and very strong, given the high effect sizes, role of personal attitudes, subjective norm and perceived behavioral control in prediction of intentions, thus being consistent with a large body of research in this domain (see for example de Leeuw et al., 2015; Fielding et al., 2008). Yet, to better explain and predict behavioral and social change, the social context with its social norms, seems to be important to be considered in interaction with personal attitudes since others' behavior has shown strongly influence our own actions (Portelinha & Elcheroth, 2016; Tankard & Paluck, 2017). Thus, a dynamic interplay between personal attitudes and perceived group norms is shown to be one of the important mechanisms to be considered when it comes to explain behavioral change.

Moreover, our research allowed to distinguish between the influences of group-based (i.e., perceived group norms that focus on the attitudes of other group members) and interpersonal (i.e., subjective norms that focus on "important" others) norms, with the former seemingly being more relevant for explanation of behavioral change when it is taken in the interaction with the personal factors (i.e., attitudes). Indeed, as shows study 1b, the only interaction involving perceived group norm – and not subjective one – determined farmers' intention to convert to OF. Although both types of norms are shown to predict one's behavior, they appear to be very distinguishable at the same time (see also Park & Smith, 2005; Ravis & Sheeran, 2003). Based on the present findings, one might conclude that whilst subjective norm shows a strong additive effect on behavioral intention, perceived group norm appears to show rather an interactive effect with personal factors (i.e., attitudes). Put differently, farmers' attitudes were significantly moderated by their perceptions of the group norms in studies 1b and 2. Thus, this might partly explain why the interactive effects between attitudes and norms

have not been previously considered by the research within TPB. Such moderation of attitudes by perceived group norm reflects the operation of different social processes which helps to further understand the relationship between variables, especially its normative component, in models such as TPB.

Taken as a whole, the present research has successfully considered two major points that were raised by previous literature concerning the reconceptualization of the normative component (Terry & Hogg, 1996) and the independency effect between attitudes and norms (Grube & Morgan, 1990) within the TPB. It is worth noting that in our research the interactive effect between attitudes and perceived group norms was confirmed both using real behavior (i.e., farmers' actual farming practice, Studies 1a and 1b) and behavioral intentions (i.e., becoming an organic farmer, Studies 1b and 2) thus decreasing the possibility of an eventual intention-behavior gap problem (Dolinski, 2018; Sheeran & Webb, 2016 for a review). We believe that the future research should benefit from such evidence and take a closer look at interactive rather than additive effects of personal and social factors while predicting and explaining individual behavioral changes. Moreover, future research should also benefit from examining the dynamic interplay between attitudes and (personal and societal level) descriptive norms (i.e., prevalence of the given behavior, Park & Smith, 2007), the latter shown to be a robust predictor of the behavior (see Park & Smith, 2007; see also Manning, 2009; Ravis & Sheeran, 2003). Since Park and Smith (2007) have shown that the personal descriptive norms moderated the effect of personal attitude the behavioral intent to sign an organ-donor registry, it would be relevant to examine whether the interaction between descriptive norms and personal attitudes might explain the social change behaviors as well. Since the effects of the norms can be highly dependent on the types of behavior under scrutiny (Park & Smith, 2007), the implication of such research would be to allow to better understand which norms do impact the social change behaviors.

The present findings have also important implications for our current practical understanding of minority influence especially in times of social change. Previous research on the relations between attitudes, norms and behavior have tended to be framed in the context of a conformity process in which personal attitudes are expected to be shaped by the majority group norm (Asch, 1956; Noelle-Neumann, 1974; Terry & Hogg, 1996). Moreover, according to TPB or social identity perspectives, both attitudes and social norms are also pulling behavior in the same direction. The present data collected in the context of innovative behavior offers an interesting perspective on behavioral change, moreover applied to environmental domain where important changes in behaviors and practices are urgently needed. A mismatch between attitudes and perceived attitudes of other members of one's own group seems increasing the likelihood of engagement in minority and non-conformist way of doing things, here organic mode of farming. The literature on minority influence offers some insights into the explanation for such a counter-conformity and beneficial effects of minority support (Moscovici, 1980). To support our findings, studying the pro-environmental behavior, Lalot and collaborators (2018) have shown that the numerical minority support makes people more likely to engage in behaviors consistent with their initial attitudes (see also Falomir-Pichastor, Mugny, Quiamzade, & Gabarrot, 2008). Similarly, our results showed that perceiving one's personal position being different from the majority (and thus being supported only by a minority) might energize people to act in line with their attitude, in order to change the prevailing way of doing things. Thus, a mismatch phenomenon represents a supplemental important explanation of individual behavioral change.

Limitations and Perspectives

Although present studies used large and ecologically valid samples we acknowledge important methodological limitations. Firstly, given the correlational nature of the present research, it is not possible to claim that the mismatch between attitudes and perceived group

norm has a causal impact on behavior. It is worth noting however that the use of a correlational design is a feature that is shared within practically the whole body of research conducted on TPB (Sussman & Gifford, 2019). Nevertheless, future research should test for reverse-causal relations from intentions to main predictors of the model and manipulate experimentally the phenomenon of the mismatch to sustain the argument that the effects found in the present study reflect specific causal relations among the variables (see Portelinha & Elcheroth, 2016).

Our data suggest, although did not properly measure, that counter-conformity resulting from individuals' perception of a discrepancy between their attitudes and the norm might be underpinned by their eagerness to change a given group norm. An alternative explanation might be also provided for the found pattern. By assuming that the organic farming is increasing in its prevalence as suggested by the increasing organic surfaces and consumer demand, our respondents might anticipate an ongoing change byproduct of which the organic farming will be normative practice and thus conform to this emerging future norm (i.e., pre-conformity, Sparkman & Walton, 2017). For instance, dynamic norms (i.e., representations of change in other people's behavior) were shown to have a robust effect on behavioral change even if this norm is at odds with the current one (Sparkman & Walton, 2017). Thus, to clarify underpinning mechanisms of the counter-conformity actions, future studies should examine through an experimental design the eventual effects of the individual willingness to change the norm on the one hand and their perception of normative change on the other in behavioral intentions.

Conclusion

Applied to the environmental domain where the changes are urgently needed, this research suggests that integrating supplemental social psychological factors into the theory of planned behavior may allow to advance in the understanding of changes in social and

behavioral practices. By examining the proximate behavioral causes of, fundamental for the environment actors as farmers, intentions to switch to more sustainable agriculture, our findings suggest that the interaction between personal and social factors seem to be important to be considered for a better understanding of behavioral adaptation to environmental problems (Swim et al., 2011). Future research within the field should examine such potential concerns in order to further explore the obstacles and resistances to environmentally-friendly practices among both farmers and general population.

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Endnotes

1. All materials and data relating to all studies of the present project can be accessed at:
https://osf.io/fnuhd/?view_only=196cc99e553f407ea1300a84da842a47
2. IDARI (2003-2006) has been funded under the European Commission's Framework Program 5 (FP5) Quality of Life and Management of Living Resources, Key Action 5.
http://cordis.europa.eu/project/rcn/67366_en.html
3. Exploratory analysis was conducted without PBC in the model. The Attitudes x Perceived norm interaction of interest remained significant (see Table A2 in Appendices for the details). Moreover, when decomposed, the simple slopes analyses remained the same.
4. The order of presenting attitudes and perceived group norm items were counter balanced. Half of the participants were asked to indicate their attitudes before their perceptions of the group norm and the order was reversed for the remaining half. However, once this variable was included in our main statistical analyses, it did not show any effect so it was not considered in the final analyses.

List of Figure Captions

Figure 1. Farmers' mean scores of personal attitudes toward the organic farming (OF) and perceived norm of OF as a function of their farming practice (Study 1a).

* $p < .05$

Figure 2. Interactive effects between personal attitudes and perceived group norm on conventional farmers' intention to switch to organic farming (Study 1b). SD = Standard Deviation.

* $p < .01$

Figure 3. Mean scores of personal attitudes and perceived group norm toward organic farming as function of students' intention to become an organic farmer (yes, no), Study 2.

*** $p < .001$

Appendices

Table A1

Descriptive Statistics for Tested Variables (Means, Standard Deviations and Bivariate Correlations) for Conventional Farmers, Study 1 b

Variable	M (SD)	1	2	3	4	5
1. Personal attitudes	4.92 (.89)	-				
2. Perceived norm	4.08 (1.25)	.24***	-			
3. Perceived behavioral control	3.75 (1.22)	.19***	.03	-		
4. Subjective norm	3.65 (1.28)	.37***	.18***	.42***	-	
5. Behavioral intention	3.65 (1.78)	.34***	.11***	.58***	.49***	-

Note. OF = Organic Farming.

*** $p < .001$.

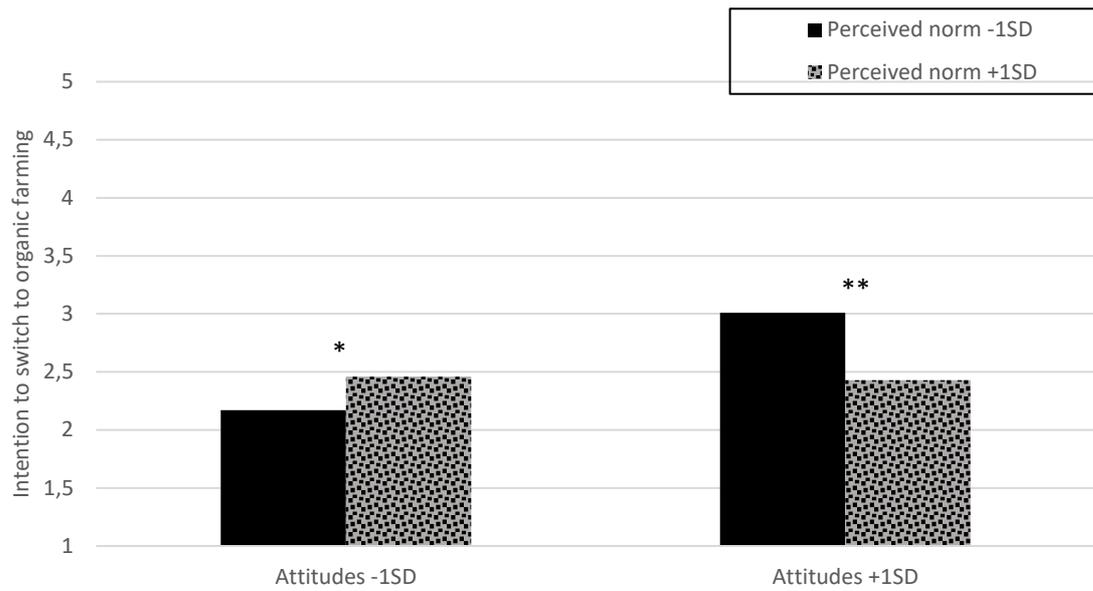


Figure A1. Interactive effect between personal attitudes and perceived group norm on intention to switch to organic farming for conventional farmers with low level of perceived behavioral control (Study 1b). SD = Standard Deviation.

* $p < .05$. ** $p < .01$

Table A2

Multiple Linear Regression Predicting Behavioral Intention From Personal Attitudes and Perceived Group Norm (exploratory analysis, study 1b)

Predictor	<i>B</i>	<i>ES</i>	<i>t</i>	η^2_p
Attitudes	.63	.08	7.67***	.096
Perceived norm	.07	.06	1.20	.003
Attitudes x Perceived norm	-.14	.06	-2.26*	.009

$F(3, 551) = 26.55, p < .001, \eta^2_p = .126, R^2_{adj} = .122.$

Note. * $p < .05$. *** $p < .001$.