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Article

# Conflict over Mining in Rural China: A Comprehensive Survey of Intentions and Strategies for Environmental Activism

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**Abstract:** Mining causes severe adverse effects such as pollution and forced resettlement. Accordingly, it has prompted conflicts that are also evident in China. Our study assesses whether and how rural residents' engage in environmental activism (EA) against mining. This is achieved by constructing a model of EA strategies, coupled to variables that examine respondents' intentions. The model uses data from a survey ( $n = 352$ ) covering 37 villages spread over 5 provinces and 1 provincial-level municipality. The model is based on a refinement of the theory of planned behavior (TPB). Various findings are reported: (1) a majority of respondents (77%) believes that pollution in the mining areas is serious; (2) there is pessimism about the effects of EA with 41% believing it does not improve the environment, and less than one-fifth feeling the government supports EA, contradictorily; (3) well over half has engaged in one or more forms of EA, while (4) dominant EA strategies consist of complaining to local government or village authorities (both over 40%), or open protest (opted for by over 17%); (5) economic dependency and gender affect the intention for EA, as those employed in mining and women are less inclined to participate. Whereas studies pointed to "inclined abstainers" or the "silent majority", this study ascertains that—with regard to mining—rural residents are not silent. We posit that a threshold of environmental endurance might have been reached. In this context, policymakers need to tackle the adverse effects of mining, as it is likely to generate more violent confrontations that ultimately pose risks to political credibility and social stability.

**Keywords:** mining; environmentalism; farmers' resistance; social conflict and protest

## 1. Introduction

Environmental pollution in China has reached alarming levels and is severely affecting public health in the country [1–3]. Facing increasing ecological degradation, environmental activism (EA) has been growing, either in the form of activism driven by environmental non-governmental organizations (ENGOS) or more localized grievance-driven social mobilization. Since the 1990s, China has witnessed a rapid rise in ENGOS [4–6], while grievance-driven activism by pollution victims has also proliferated. For example, the number of environment-related petition letters increased from 58,678 in 1995 to 701,073 in 2010 [7] (p. 2). China's cities also witnessed an increase in protests over waste incineration and chemical plants [8–11], coupled to protests against industrial pollution in the rural areas [12,13].

Previous studies on environmental activism in China have predominantly focused on ENGOS [4–6,14–16], explaining its emergence, organization, and capacity. Environmental activism against polluting firms initiated by affected victims has also attracted academic attention. Scholars

have illustrated how economic dependency complicates the relationship between pollution and protest [12,17], whereas other studies pinpointed the difficulties to redress pollution grievances via formal complaints [18,19], legal routes [12,20,21], and collective protests [22,23].

Although there is a large amount of literature examining environmental activism in China, a systematic examination of individuals' attitude and exposure to environmental issues in relation to the likelihood of and chosen form of activism is scant. This study seeks to answer these questions by employing a widely used social psychological model, the theory of planned behavior (TPB) [24,25]. This research is based on a demographically and economically diversified survey answered by 352 farmers living in the vicinity of mines in 37 villages dispersed over eight counties.

The findings indicate that there is a high awareness of the severity of pollution, as well as of the environmental and health risks. Moreover, the level of environmental activism is high with 55.7% of the respondents having taken one or more different forms of action against mining. When rural residents undertake action, they frequently opt for collective protests in addition to complaining to local state authorities and the village committee. Neighbors' participation plays an important role while the intention to engage in EA and the perception of the severity of pollution are also important in explaining individuals' engagement in EA.

Situated in the context of mining in rural China, this study's findings might contribute to a deeper understanding of the participation in environmental activism in general, and in the Chinese context in particular. Mining, on the one hand, has long been suggested as a complementary livelihood to alleviate rural poverty [26–29]. On the other hand, as mining competes with other uses of land, it poses significant threats to rural livelihoods such as through dispossession of land and disruption of the ecosystem [30,31]. It should also not be forgotten that mining has significant direct and indirect impacts on rural land conversion [32–35]. In light of the dilemma between the economy and environment, this study may provide important lessons for other developed and developing economies that rely on mining.

The paper is structured as follows. The next section presents a literature review on environmental activism in China. The section thereafter discusses the research design of this study, including the analytical framework, fieldwork sites, and data collection. Section 4 presents the empirical findings and discussion. The final section concludes the paper.

## 2. A Review of Environmental Activism

Environmental or green activism can be distinguished between ENGO-driven activism and grievance-driven social mobilization [11,36]. While ENGOs are mostly motivated by a more general concern over national and global environmental grievances, the latter is usually the result of a "personal complaint" [37] (p. 119). The two types are often contrasting, as most ENGOs tend to organize their activities with long-term goals in mind and promote wider public and environmental interests. In contrast, "personal complaint" environmental activists are more concerned about defending their personal interests against environmental threats and gain justice in compensation procedures [36,38–40].

Since the 1990s, China has witnessed a sharp increase of ENGOs [4–6]. This has been attributed to the ecological modernization and the "greening of the state" at the macro-level [15,41], but also to social networks (*guanxi*) at the micro-level [16]. Financial support and expertise provided by international ENGOs also explain the rise of local green activism in some regions [42,43]. While the number of ENGOs is growing fast, they are limited in their capacities and resources [4,14,16]. Within China's semi-authoritarian political context, ENGOs have adopted a more "embedded" form of activism, which is expressed in a focus on "reforms from the within", by targeting politically less sensitive issues, while fostering *guanxi* with sympathetic Party-state officials [4,14]. In result, ENGOs by and large adopt non-confrontational strategies towards the government and refrain from too openly debating, criticizing, or questioning the state's policies, to avoid being labeled as "political" organizations and having to suspend activities.

More isolated environmental activism by affected citizens have also proliferated in more recent years, for instance, as can be witnessed by the protests over waste incineration and Paraxylene plants in urban areas [8–11] or protests against industrial pollution in rural China [12,13]. It has become clear that local social, economic and political circumstances strongly influence Chinese citizens' responses to pollution, most clearly demonstrated by the varying strategies adopted in China's urban and rural areas.

First, while mining and other industries bring about severe pollution, they often also bring employment opportunities to rural residents. Several studies [44–46] have pointed to instances where rural dwellers have become financially dependent on compensation payments from local polluters, reducing their willingness to resist against environmental degradation. Meanwhile, incinerators could bring multiple benefits for urban dwellers, for example, efficiently reduce waste using fewer land resources, and generate energy by burning waste. However, these benefits are often less discernible and therefore also less likely to influence urban citizens' actions [11]. Second, the different degrees of economic dependency of rural and urban residents on polluting industries result in varying outcomes. Previous studies show that rural residents mostly respond passively to tangible pollution (i.e., evident to human sensory perception) [12,13,35]. Contrarily, resistance to waste incineration and Paraxylene plants in urban areas is often preemptive as it often occurs at the planning stage of the plants [8,11]. Third, the available resources between rural and urban victims also differ. Due to the urban-rural gap, the "digital divide" (that is, the level of internet usage) [47], and the limited media coverage in rural areas, urban residents are more likely to initiate online mobilization and obtain support from ENGOs and lawyers [11,48]. Contrarily, pollution victims in the rural areas are usually more isolated and without the support of third parties [12].

The dependency on local polluters has an impact on how the victims frame their grievances and claim compensation. For example, Jing [13] illustrated how rural residents initiated protests to protect the ecological basis of human existence, instead of framing their grievances in health or environmental terms. This is also evident in the cases where pollution-affected residents actively strive for financial compensation [45,49,50], and, in certain instances, stage protests to secure material gains from polluters and local officials, instead of asking for environmental improvement or the closure of plants [13,51]. In other cases, farmers have become so economically dependent on the polluters that they took no action and chose to live with the pollution despite the adverse effects on health, such as cancer, respiratory problems and other illnesses [52].

Difficulties, fears, and previous experiences also explain why citizens and farmers are unwilling to take actions against polluting activities. Litigation against polluters are paired with formidable obstacles within and beyond the court [12,20,21,53]. Procedural obstacles, such as providing evidence of the damages and the causality between mining and environmental effects, as well as high fees for the acceptance of cases, deter citizens from taking further action [12,20]. Activists often have trouble framing their actions as legitimate, especially when local authorities claim a legal basis for imposing punishment.

The perceived chance of success also influences the motivation to engage in environmental activism. Research has found that filing complaints to environmental protection bureaus is often in vain, as they tend to focus on tangible nuisance complaints that are easily addressed and with immediate effect, while steering away from more deep-rooted violations [18,19]. Moreover, it is difficult to win a case in courts where local protectionism is pervasive [54–56]. Lastly, protests may invoke suppression from local governments, where participants—and especially the leaders—are often charged with the crimes of racketeering and inciting a mob [22].

Despite these obstacles, the government is generally the main party to which farmers turn to. As evidenced by other studies [35,57], instead of complaining to or negotiating with mining companies, Chinese farmers are more likely to approach the local governments. Moreover, in addition to oft-observed suppression and concessions to polluters, the local state also employs wealth distributing strategies to cope with resource conflicts, such as by providing employment opportunities and

social welfare benefits to the communities [57]. In this context, the government's attitude towards environmental activism plays a crucial role in farmers' participation in EA.

At the global level, recent forms of activism in the mining industry includes referendums, which emerged as a strategy in the 2000s and was increasingly used by communities in Latin America [58,59]. Other strategies, such as taking a transnational mining company to court at the host state or international courts [60], and the "glocalization" of mining conflicts by connecting to international NGOs and global issues, such as climate change [61–63], have also been observed. However, in (semi)authoritarian settings, such forms of mobilization are seldom practiced. In China, environmental activism features as a fragmentary, de-politicized and highly localized phenomenon [64]. It is why we adopt a notion of activism, including an "embedded activism", often employed in the Chinese context [65–67], and which will be further elaborated in the next section.

There are relatively few studies that measure the modes of actions in relation to social grievances in China in general [68,69], or environmental grievances in particular [65,66]. From the available studies, some general conclusions can be drawn. First, there is a significant "silent majority", a group of residents that does not take any actions even when exposed to pollution and environmental degradation (For example, in the 2003 Chinese General Social Survey, among 3,878 self-identified pollution victims who had suffered harm due to environmental pollution, more than 61% did not take any action [60] (p. 122). For general grievances, the survey yielded a percentage of 33.1 of the respondents who took no actions [59] (p. 466)). Second, seeking mediation through acquaintances, village and state authorities is the most commonly used way to deal with environmental grievances. Resorting to legal action is less favored, and engaging in protests is even less opted for in China (In fact, the participation in protests is very low, for example, one study yielded a percentage of 0.65% of all the surveyed respondents [60] (p. 123), while, in other studies [58,59], protest was not even separately listed in the survey results). Studies have also examined the influence of demographic and socio-economic characteristics on the self-identification of pollution victims and their actions [65,66]. The key finding is that the well-educated, and those with a relatively high income and social capital, are more likely to participate in environmental protection activities.

While these studies help to understand the patterns of social conflicts and modes of actions, a systematic examination of individuals' motives to engage in activism—with particular reference to rural China—is still under-researched. This study aims to fill this gap through a model based on a readjustment of the theory of planned behavior to study the strategies and intention for environmental activism against polluting mines [25,70]. The adopted theory, and the study's methodological considerations, are further discussed in the next section.

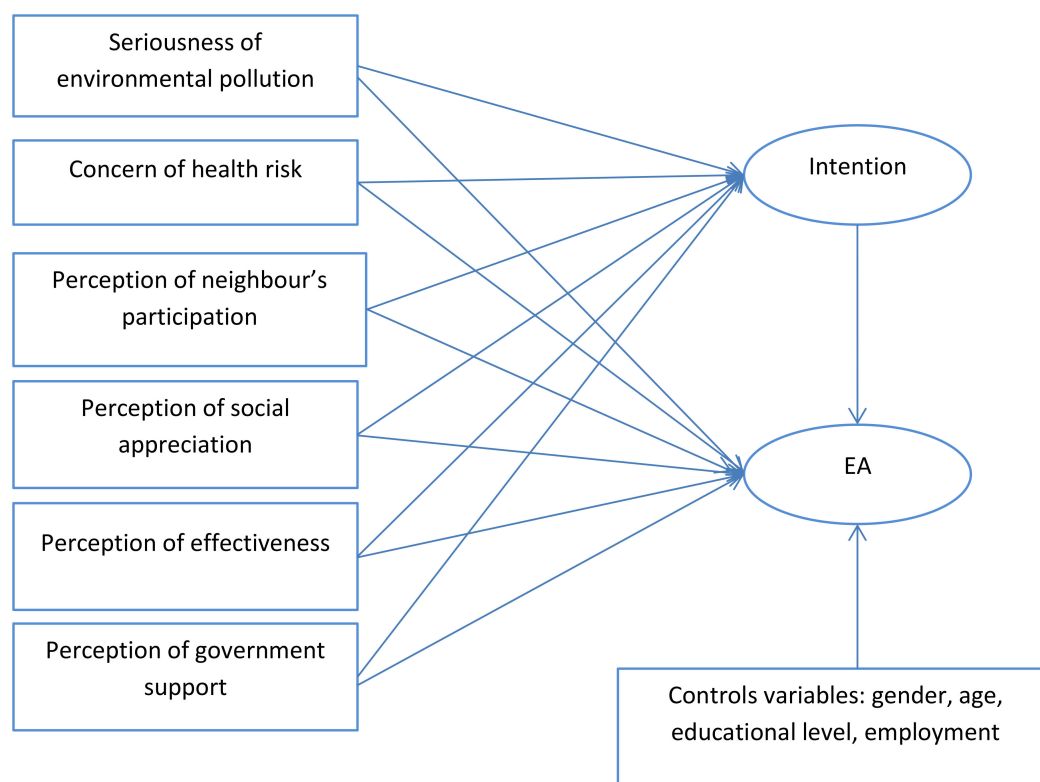
### 3. Materials and Methods

#### 3.1. Analytical Framework

Many models have been developed to explain environmental behavior [25,70–72]. The underlying assumption for most models is that individuals make rational choices that maximize their benefits and minimize their costs. In this regard, an influential framework is the Theory of Planned Behavior (TPB) [25,70], which suggests that the most proximal determinant of an individual's behavior is his or her intention. In turn, this intention is predicted by three components: the attitude, subjective norms, and perceived behavior control. According to the theory, individuals who hold pro-active attitudes, believe that there is normative support for their action, and those who perceive that they can easily perform their action, are most likely to have an intention that eventually drives them to accomplish their behavior.

In the field of environmental activism, the TPB might have theoretical and practical implications. By testing theoretically-based hypotheses about the determinants of certain behavior, we might contribute to gain a better understanding of environmentalism. TPB has been applied in and supported by studies on many different forms of environmental action, for example, antinuclear activism and

participation in environmental groups [73–75]. For some behaviors and contexts, the inclusion of other variables may increase the predictability of the model. For example, self-identity, the perception of health risks, and information have been added in previous studies and successfully helped to increase the explanatory power of the model [67,71,76]. For this study, the initial TPB model is adopted and further adjusted to the needs of the study in line with the existing literature. The analytical framework that we use is depicted in Figure 1.



**Figure 1.** An analytical framework for planned behavior. Source: Drawn by authors.

**Strategies for EA:** As mentioned above, environmental activism is often distinguished into ENGO-driven activism and individual, grievance-driven activism. Previous studies treat environmental activism as a function of the behaviors and interactions with an environmental organization [71,75] (for example, Tindall et al. [66] (p. 910) explicitly define environmental activism as “specific movement-supporting activities that are promoted by environmental organizations”, such as participation in events organized by NGOs, financial contribution to an environmental group, participation in protests, and voting for pro-environmental groups). As this study focuses on the individuals that embark on collective action, we operationalized this by constructing a set of nine, possible EA strategies (derived from previous studies on protests against mining in China [65–67]). The set consists of: approaching the village committee (EA1), approaching the township government (EA2), approaching environmental protection bureaus (EPB) by letter (EA3), by visiting (EA4), directly negotiating with the mines (EA5), resorting to the media (EA6) or the judicial system (EA7), participating in a protest against the mines (EA8), and abstaining from applying for a job in the mines (EA9). Respondents were asked whether they had engaged in any of these pre-defined items. For each item, a binary score is assigned, where the sum of the nine items is used to estimate the degree of EA, leading to a total score between 0 and 9 for every respondent.

**Intention for EA:** The TPB assumes that an individual’s behavior is determined by his or her intention, i.e., a correlation between intention and behavior [24]. Often, when it is not possible to measure actual behavior, studies looked at the respondents’ intention as a proxy to engage in that

behavior [77–79] (in the field of marketing, when certain measures have not been deployed and therefore no actual behavior can be measured, the intention of paying a premium price to consume, the WTP or Willingness To Pay, is assessed to find out consumers' acceptance of, for instance, renewable energy or food labeling [69,70]). However, studies have also indicated the problem of "inclined abstainers" [80], i.e., those who were inclined to perform a certain behavior but did not act accordingly. To address this issue, the present study examines both the intention to engage in EA, as well as the self-reported behavior (operationalized through the aforementioned nine EA strategies).

The attitude towards environmental behavior is measured by two key variables: the perception of the severity of pollution and concerns over health risk (as a measure of the level of environmental degradation). Two additional variables, the perception of neighbors' participation and the social appreciation of EA are constructed as reflecting subjective norms. The term neighbor is defined as residents living next door or very close to the respondent, and that are not relatives or friends. Perceived behavior control is represented by the individual's perception of the difficulty to perform the behavior, and the internal and external efficacies. Internal efficacy refers to beliefs that individual participation can help to prevent an environmental problem, while external efficacy refers to the beliefs of external actors' support to resident's environmental activism [81,82]. Following this, two variables are constructed in the model: self-reported effectiveness of EA, and government support to EA. A five-point Likert scale was designed to measure the degree of each factor, with 1 = lowest, and 5 = highest (Table 1). The control variables are the demographic variables, consisting of gender, educational level, age, and economic dependency on mining operationalized as employment.

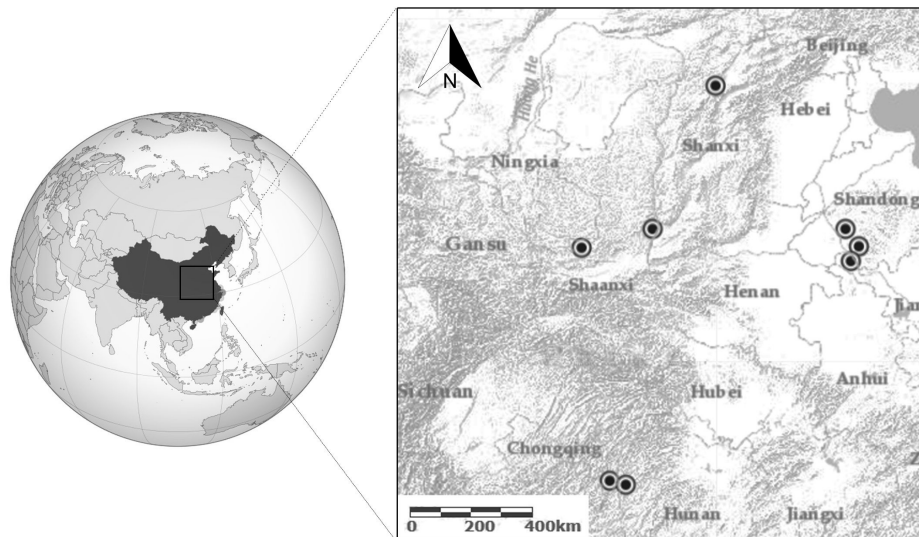
**Table 1.** Definition and valuation of variables in the study (for more information on the variables, see the Appendix A).

| Variable                     | Description of the iTem                      | Valuation   |
|------------------------------|----------------------------------------------|-------------|
| Environmental activism level | Sum of (EA1–EA9)                             | 0–9         |
| SERIOUSNESS                  | Perception of severity of pollution          |             |
| HEALTH                       | Perception of health risks of pollution      |             |
| NEIGHBOR                     | Perception of neighbors' participation in EA |             |
| APPRECIATION                 | Social appreciation of EA                    | 1 = Lowest; |
| EFFECTIVENESS                | Effectiveness of EA efforts                  | 5 = highest |
| SUPPORT                      | Degree of government support to EA           |             |
| INTENTION                    | Willingness of EA against polluters          |             |

### 3.2. Study Sites

The fieldwork was conducted in eight counties across five provinces and one provincial-level municipality (Figure 2), respectively Binxian and Hancheng county (Shaanxi Province, Shuozhou county (Shanxi Province), Yanzhou and Tengzhou county (Shandong Province), Peixian county (Jiangsu Province), Xiushan county (Chongqing Municipality), and Huayuan county (Hunan Province). The counties were selected from an official list of mineral resource-abundant counties designated by the Chinese State Council [83], with the aim to represent and account for (i) various stages of mineral resource exploitation (four stages are distinguished in this paper following a report by the State Council: (i) the emerging stage (Shuozhou, Binxian); (ii) maturing stage (Hancheng, Jining, Xiushan, Huayuan); (iii) exhaustion stage (Tengzhou); and (iv) mine reclamation or recovery stage (Peixian)); (ii) geographical variety (China's vast geographical areas are represented as follows: (i) the east coast (Jiangsu and Shandong Province), (ii) Northwest (Shanxi and Shaanxi Province), and (iii) Southwest (Hunan Province and Chongqing Municipality). These areas are covered by plains, arid steppes, and mountainous areas); (iii) varying levels of economic development (regional disparities exist among the selected provinces, with relatively wealthy eastern coastal provinces (Jiangsu and Shandong), and the relatively poor inland provinces (Shanxi, Shaanxi, Hunan, and Chongqing); and (iv) different mineral resources (the two counties in Chongqing Municipality and Hunan Province are ranked among the nation's largest producers of zinc, lead, and manganese, while the other six are predominantly

involved in coal mining). In each county, four to five villages were selected, totaling 37 villages. In the Chinese context, a rural community typically consists of an administrative village (*xingzheng cun*) or a natural village (*ziran cun*). The village community plays a decisive role in resource allocation, especially with regard to the distribution of agricultural land, and in some cases, the distribution of compensations for land expropriation and resettlement.



**Figure 2.** Map of fieldwork sites. Source: Drawn by Kees Krul.

It needs mentioning that EA against mining is highly sensitive in China. The primary data were extremely difficult to obtain, while local government and mining companies at times actively aimed to cover up certain conditions and circumstances. In this context, we particularly sought to protect the rights and interests of the respondents, and the survey and interviews did not record or store personal data. The research was overseen by the Ethics Officer of the European Research Council and an independent Human Research Ethics Committee of the university. No interview or survey was carried out without prior informed consent from the respondent.

### 3.3. Characteristics of the Sample

A total of 352 valid questionnaires was collected. The survey was carried out between May and September 2015 by a team of specially trained, local undergraduate students, supervised by one of the authors. To ensure the quality and reliability of the survey, the student interviewers were randomly spot-checked. A non-probability sampling approach was used by going from household to household while group meetings were intentionally avoided. Per household, one respondent was selected and interviewed. Although the sample was not representative, a higher degree of representativeness was ensured via theoretical saturation to determine the size of the sample, up to the point where additional data provided no additional insights into the research questions [84,85]. Moreover, a higher degree of validity (data accuracy) and reliability (data consistency) was sought through the purposive selection of the research sites. An overview of the sample characteristics is presented in Table 2. A total of 121 respondents, or 34.4% of the sample, indicate that their immediate family members work or have worked for mining companies. The data were recorded in SPSS (Version 24, IBM, Armonk, NY, USA: 2016), and different statistical analyses were performed, at significance level  $p < 0.05$ .



**Table 2.** Characteristics of the survey sample.

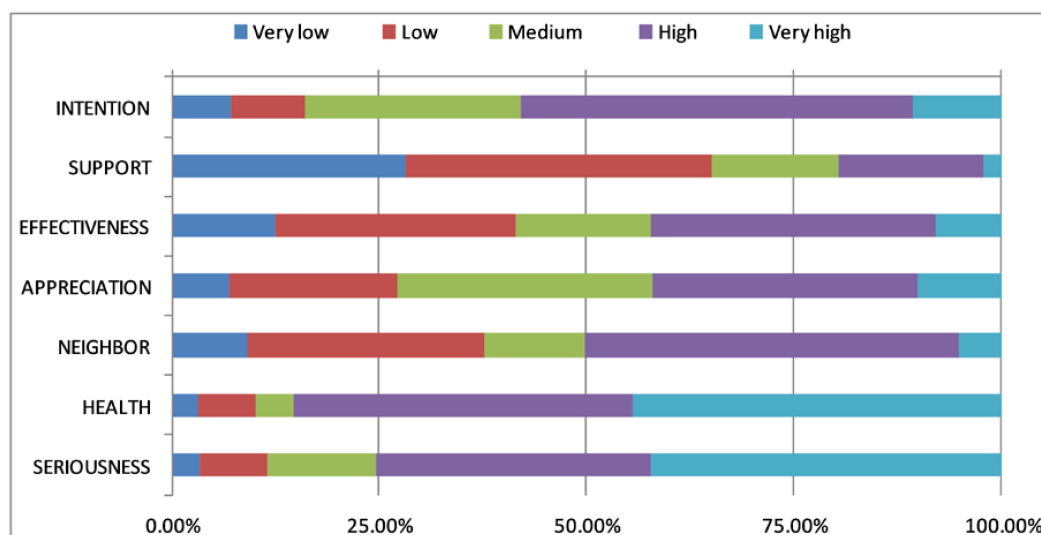
| Characteristics     | Group                 | Number | Percentage (%) |
|---------------------|-----------------------|--------|----------------|
| Gender              | Male                  | 239    | 67.9           |
|                     | Female                | 113    | 32.1           |
| Age                 | 18–30                 | 38     | 10.8           |
|                     | 31–60                 | 194    | 55.1           |
|                     | >61                   | 120    | 34.0           |
| Education           | Illiterate            | 69     | 19.6           |
|                     | Primary school        | 99     | 28.1           |
|                     | Middle school         | 125    | 35.6           |
|                     | High school and above | 61     | 16.7           |
| Household size      | ≤3                    | 104    | 29.5           |
|                     | 4–5                   | 123    | 34.9           |
|                     | ≥6                    | 125    | 35.6           |
|                     | Mean                  | 4.92   |                |
| Employment in Mines | Employed in mines     | 121    | 34.4           |
|                     | Not employed in mines | 231    | 65.6           |

Source: This survey.

## 4. Results

### 4.1. Descriptive Statistics of the Predicting Variables

Figure 3 presents the key variables defined in the analytical framework. Mining is a severely hazardous industry, affecting land and water resources while producing toxic waste and pollutants. The majority of respondents (77.3%) believe that environmental pollution is serious (Mean = 4.03). An even higher percentage (85.4%) is concerned with the risks of pollution to their health (Mean = 4.17). The high scores indicate that local residents consider pollution in the mining areas as very serious.



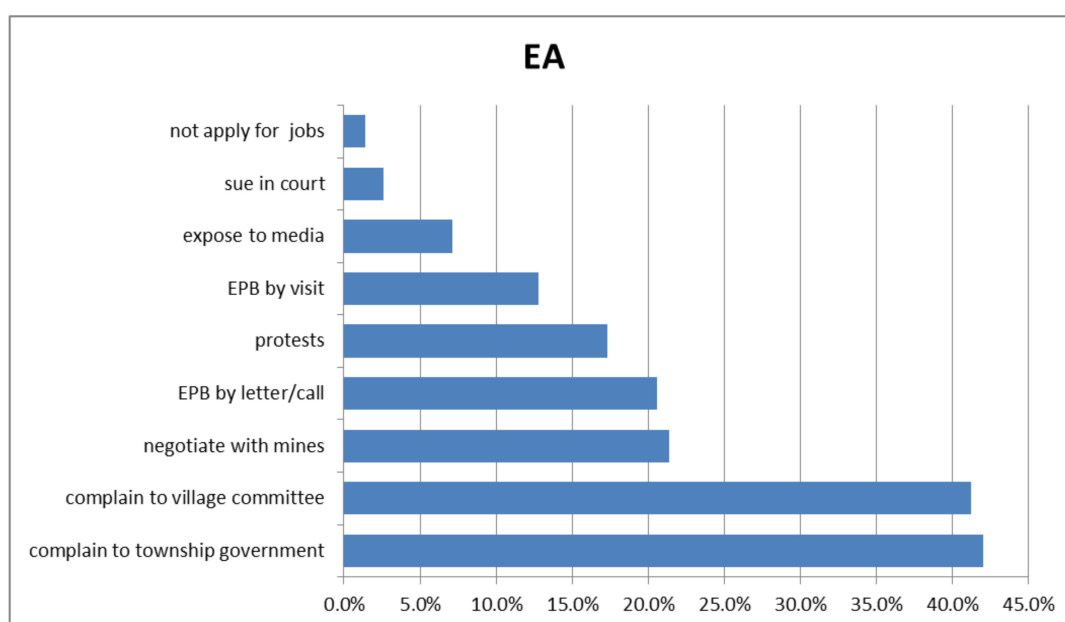
**Figure 3.** Statistical summary of the predicting variables ( $n = 352$ ) (the survey questions are included in the Appendix A). Source: This survey.

Facing environmental pollution, the respondents show a relatively high intention to engage in EA, with a Mean of 3.45. Similarly, a Mean of 3.08 suggests a moderate extent of neighbors' participation, about half of the respondents believe that their neighbors participate in EA. The farmers feel that their endeavors would be moderately appreciated by other people, as suggested by a Mean average of 3.18. Nevertheless, the outcome of EA is not seen as promising, as 41.4% believes that EA could not help

to improve the environment. Moreover, only 19.5% thinks that the government and environmental agencies support residents' EA practices, with a low score of 2.28.

#### 4.2. Resident's Environmental Activism

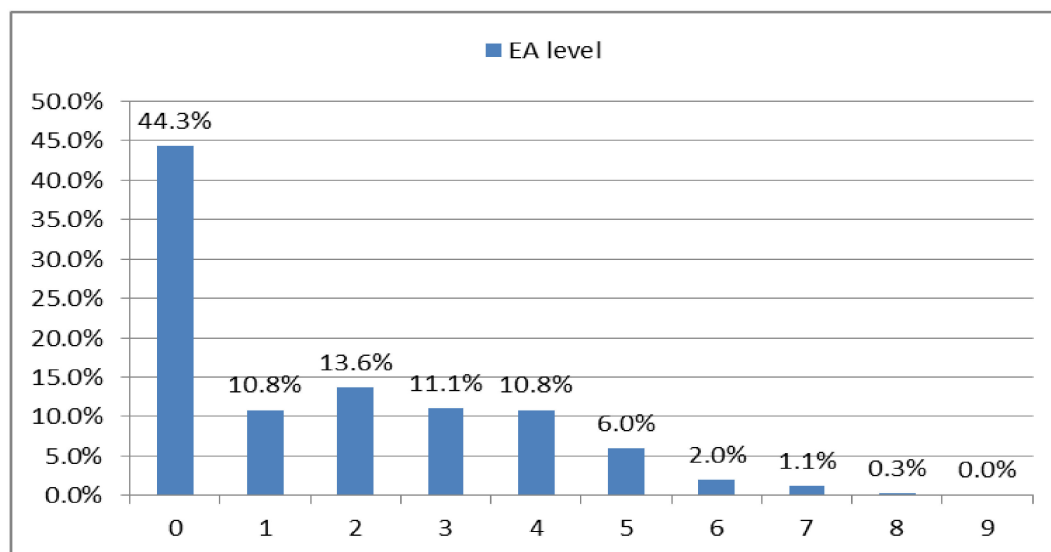
Figure 4 provides the occurrence of nine EA strategies adopted by individuals. The dominant strategies are to complain to the township government (42.0%) or the village committee (41.2%). Other favored ways included direct negotiation with the mining company (21.4%), complaints to environmental protection bureaus by letters or phone call (20.6%), as well as open protests (17.3%). Less favored were direct visits to environmental protection agencies (12.8%), the use of the media (7.1%) and courts (2.6%). Only a marginal group of people (1.4%) considered not applying for a job at the mining company as a way of EA.



**Figure 4.** Frequencies of resident's environmental activism (EA) ( $n = 352$ ). Source: This survey.

The sum of the nine strategies was calculated to estimate a respondent's degree of involvement in EA, illustrated in Figure 5. The largest group (55.7%) had engaged in one or more forms of EA, with a Mean of 1.64 (indicating that the surveyed rural residents participated on average in more than one form of EA). In addition, close to one-tenth (9.4%) of the respondents appear to be "seasoned activists" in terms of involvement in more than five of the nine EA forms. All in all, the general level of EA is high.

At this point, there are two noteworthy issues: first, our study appears to disprove the notion of the "silent majority" or "inclined abstainers" as reported in other studies on Chinese EA [65,66,68,69]. The marked difference with other studies could be explained by the fact that mining has induced commonly felt problems with profound effects, such as land subsidence. Such problems affect entire villages and townships, as illustrated in a recent article on mining-induced displacement and resettlement [35] (see: [Fieldwork Video Footage](#)). When villagers are faced with problems at such a scale, the collective organization of protests receives a strong stimulus. Second, the most commonly used ways to address grievances in China are to approach state and village authorities, which does concur with the previous studies. In light of the above, we believe that a certain threshold might have been reached as a result of which rural residents refuse to further endure the adverse effects of mining.



**Figure 5.** Degree of environmental activism (EA) ( $n = 352$ ). Source: This survey.

#### 4.3. Variances of Environmental Activism by the Control Variables

To understand the variance of EA in relation to demographic and economic variables, an independent sample *t*-test or ANOVA test was conducted (Table 3). The *t*-test ascertains that there is a significant difference between gender in EA level, as the average times that men engage in EA is 1.88, significantly higher compared to women (1.12). Statistical analysis also ascertains that there is a significant difference between those employed in mines and those who are not employed in mines. Put differently, with a working history in mining, respondents are less likely to participate in EA. This confirms other qualitative studies in rural China, where economic dependency undermines farmers' motivation to protest against polluting industries [12,17].

**Table 3.** Environmental activism (EA) by control variables.

| Control Variables      |                       | EA Mean | Significance<br>( <i>t</i> -Test/ANOVA) | Finding         |
|------------------------|-----------------------|---------|-----------------------------------------|-----------------|
| <b>Gender</b>          | Male                  | 1.88    | $t = 3.613; p = 0.000$                  | Significant     |
|                        | Female                | 1.12    |                                         |                 |
| <b>Age</b>             | <30                   | 1.63    | $F = 0.180; p = 0.835$                  | Not significant |
|                        | 30–60                 | 1.59    |                                         |                 |
|                        | >60                   | 1.719   |                                         |                 |
| <b>Education level</b> | Illiterate            | 1.67    | $F = 0.093; p = 0.964$                  | Not significant |
|                        | Primary school        | 1.66    |                                         |                 |
|                        | Middle school         | 1.57    |                                         |                 |
|                        | High school and above | 1.71    |                                         |                 |
| <b>Employment</b>      | Employed in mines     | 1.36    | $F = 2.101; p = 0.037$                  | Significant     |
|                        | Not employed in mines | 1.78    |                                         |                 |

Source: This survey.

As for age, the middle-aged respondents reported an average of 1.59 times of EA participation, slightly lower than the young (Mean = 1.63) and the elderly (Mean = 1.71), which may be explained by the fact that the middle-aged respondents were the main labor force and more likely to work in the mines. However, the difference is not statistically significant. For those who have enrolled in high school and above, the average times of the EA is 1.71, while those who have a middle school education show the lowest EA level. However, there is no significant difference between the levels of education.

#### 4.4. Result of the Path Analysis

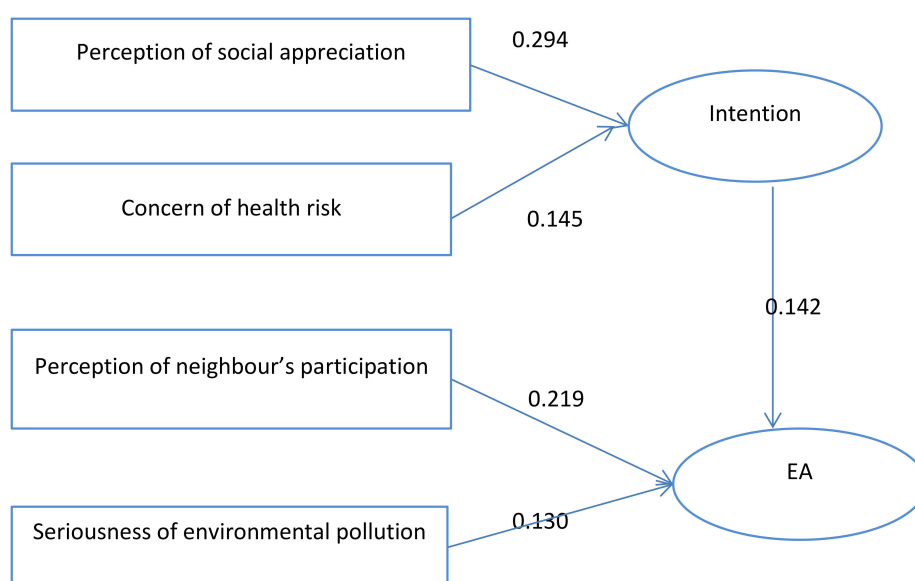
The predictive model of EA was statistically tested by means of recursive path analysis using stepwise Ordinary Least Squares (OLS) regression. Multicollinearity was first checked to make sure that there are no highly correlated predicting variables. A variance inflation factor (VIF) of 10 or even as low as 4 has been most commonly utilized to indicate excessive or serious multicollinearity [86] (p. 674). In this study, VIF for all independent variables ranges from 1.26 to 2.07, which means multicollinearity should not be a matter of concern in our regression.

In the first multiple regression analysis, all predictors were entered to identify which variables would predict EA (the control variables, e.g., gender, are excluded in the regression). If the coefficients are not significant at the 0.05 level, the paths are excluded in the final model. The path coefficients are depicted in Table 4 and Figure 6. The direct effect of the predicting variables on the EA is observed from the weight given by the path coefficient, which indicates the relative changes of EA corresponding to any change of the independent variable. The explanatory variables are significant and account only for 10.2% ( $R^2 = 0.102$ ) of the variance of the overall EA at 1% significance level. The EA level is explained by three predictors: the perception of neighbor's participation, the intention to engage in EA, and the perception of the seriousness of pollution.

**Table 4.** Regression results of environmental activism (EA).

| Dependent Variable                                                            | Predictors   | Unstandardized Coefficients |            | Standardized Coefficients | <i>t</i> | Significance |
|-------------------------------------------------------------------------------|--------------|-----------------------------|------------|---------------------------|----------|--------------|
|                                                                               |              | B                           | Std. Error | Beta                      |          |              |
| INTENTION<br>( <i>n</i> = 352; $R^2 = 0.196$ ,<br>$F = 20.764$ , $p < 0.01$ ) | Constant     | 1.722                       | 0.286      |                           | 6.026    | 0.000        |
|                                                                               | APPRECIATION | 0.270                       | 0.067      | 0.294                     | 4.053    | 0.000        |
|                                                                               | HEALTH       | 0.147                       | 0.058      | 0.145                     | 2.553    | 0.011        |
| EA Level<br>( <i>n</i> = 352; $R^2 = 0.102$ ,<br>$F = 8.504$ , $p < 0.01$ )   | Constant     | −1.338                      | 0.688      |                           | −1.944   | 0.053        |
|                                                                               | NEIGHBOR     | 0.367                       | 0.105      | 0.219                     | 3.484    | 0.001        |
|                                                                               | INTENT       | 0.276                       | 0.120      | 0.142                     | 2.299    | 0.022        |
|                                                                               | SERIOUSNESS  | 0.241                       | 0.113      | 0.130                     | 2.1132   | 0.034        |

Source: The survey by the authors.



**Figure 6.** Path analysis results for explaining environmental activism (EA). Source: This survey.

The perception of neighbors' participation plays the most important role in explaining EA, with a direct path coefficient of 0.219. This means that rural residents would like to act collectively against the mines, in line with the high occurrence of protests as shown in Section 4.2. Contrarily, the intention to engage in EA plays a less important role, which points to the fact that social pressures instead of individual cognition are more central to understanding EA. Lastly, the perception of the seriousness of environmental pollution could also trigger farmers' actions.

Three variables in the original model—concerns over health risks, social appreciation of EA, and government's support to EA—have no direct influence on the level of EA. Among those, the concerns over health risks and the social appreciation of EA have significant linkages with the intention for EA, accounting for nearly 20% ( $R^2 = 0.196$ ) of the variance. This implies that health concerns and social appreciation of EA would increase the likelihood of acting against polluting mines and create a sense of urgency against imminent threats.

The regression indicates that the TPB is a useful theoretical model for our purposes. First, it confirms the important role of subjective norms, i.e., the perception of neighbors' participation, and social appreciation of EA, in explaining farmers' intentions and actual behavior. This is understandable in collectivist societies [87] such as China, where social influences or social pressure can be an important influencing factor. This may be particularly true when the pollution is imposed upon the rural community where residents feel strongly attached to family and neighbors. Second, the findings confirm that the perceived salience of environmental threats is positively associated with an individual's involvement in environmental activism [71,88].

Nevertheless, neither the perception of the effectiveness of EA efforts nor the degree of government support has a significant correlation with either the intention for, or the actual behavior of, EA. This has the following implications. On the one hand, it shows that rural residents lack confidence in their own ability and distrust the government's capability in negotiating pollution. Rural industrial factories are the major driver of local economic development, and therefore local authorities, local cadres, and even communities form a coalition in favor of the polluting plants. This explains why, despite severe environmental risks, factories are allowed to continue their activities [89]. On the other hand, although knowing that their environmental actions might be in vain, some rural residents still opt for actions. This could, for instance, be observed in the case of petitioning, i.e., sending letters or paying visits to higher authorities to gain the support of higher level officials, albeit rarely yielding concrete results for the petitioners [90]. Moreover, in some cases, protests are initiated as a strategy to secure material gains from polluters and local officials [13,51].

## 5. Conclusions

This paper has assessed rural residents' participation in environmental activism in China's mining areas, which was achieved through the identification and quantification of their strategies and intentions. The study found that the level of EA in the rural mining area is high, with the greater majority having taken one or more forms of action against mines, while there is also a relatively high occurrence of collective protests. Dependency on the mining industry complicates the relationship between environmental pollution and EA. The study shows that rural citizens who have been employed in the mining industry are less likely to participate in EA, which also counts for gender, with men more likely to participate than women. The regression analysis shows that the EA level is best explained by three predictors: neighbors' participation, the intention to engage in EA, and the perception of the severity of pollution. Perception of the neighbors' participation plays the most significant role in explaining the EA level.

The study benefited from the large sample size that has been obtained despite the high sensitivity of mining in rural China. At the same time, the study's findings are bound by several limitations. First, despite the fact that a model of EA was operationalized and tested, the model is not comprehensive, as indicated by the generally low fraction of variance explained in predicting EA. In future research, social and physical contextual factors could be added to the model to increase its explanatory power.

A second limitation consists of the fact that each type of action is allocated the same weight in the current study. However, some actions are arguably more difficult to execute than others, and also vary in frequency.

Having said this, the findings of this study may provide valuable information for policy-making. For starters, our study indicates that environmental pollution in mining areas is perceived as severe by local residents, raising deep concerns and calling for prompt government action for environmental protection. Furthermore, the regression model confirmed that environmental activism largely depends on the perceived level of collective choice, i.e., the perception of neighbors' participation and the social appreciation of EA. The high level of participation in environmental activism suggests that a sense for environmental protection and claims for environmental justice might have reached a certain threshold.

While some actors might take action, others may use their resources to maintain the status quo or choose to do nothing, the silent majority. However, our study did not corroborate this, and, in fact, once a commonly shared perception amongst rural residents is formed, the collective organization of protests and other forms of environmentalism might become a reality. This was amply demonstrated in the areas where mining has induced wide-spread land subsidence affecting entire villages. In this context, policy makers need to take immediate and concrete measures, for example, by enhancing the participation of local residents in the decision-making over the operation of mines, the provision of long-term benefit sharing schemes (e.g., pension, unemployment benefits and medical insurance), the setting up of vocational training programs, and the establishment of funds for the compensation of mining-induced damages and pollution. In the absence of these, it is likely that the externalities of mining might pose substantial risks to the long-term credibility of China's political system and social stability [91].

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## Appendix A

| Variable | Description of the Item                                                                                                               | Choices          |
|----------|---------------------------------------------------------------------------------------------------------------------------------------|------------------|
| EA       | Have you ever taken any actions listed below against the polluting mines?                                                             |                  |
| EA1      | Report to the village committee? ( <i>xiang cunweihui fanying qingkuang?</i> )                                                        | Yes: 1;<br>No: 0 |
| EA2      | Report to the local township government? ( <i>xiang dangdi zhengfu fanying qingkuang?</i> )                                           | Yes: 1;<br>No: 0 |
| EA3      | Approach environmental protection bureaus (EPBs) by letter or phone? ( <i>xie xin huozhe da dianhua xiang huanbao bumeng tousu?</i> ) | Yes: 1;<br>No: 0 |
| EA4      | Approach environmental protection bureaus (EPBs) by visit? ( <i>qinzi dao huanbao bumeng shangfang tousu, qingqiu chuli?</i> )        | Yes: 1;<br>No: 0 |
| EA5      | Directly negotiate with the polluting mines? ( <i>zhijie he wuran qiye jiaoshe, xunqiu buchang?</i> )                                 | Yes: 1;<br>No: 0 |
| EA6      | Resort to the media? ( <i>xiang meiti baoguang?</i> )                                                                                 | Yes: 1;<br>No: 0 |
| EA7      | Resort to the judicial system? ( <i>dui wuran qiye tichu falv susong, qingqiu sunhai peichang?</i> )                                  | Yes: 1;<br>No: 0 |
| EA8      | Participate in a protest against the polluting mines? ( <i>canyu duo wuran qiye de kangyi huodong?</i> )                              | Yes: 1;<br>No: 0 |
| EA9      | Abstain from applying for a job in the polluting mines? ( <i>buqu wuran qiye yingping he gongzuo?</i> )                               | Yes: 1;<br>No: 0 |

|               |                                                                                                                                                                                                                                         |                                                                                  |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| SERIOUSNESS   | To what extent is the environmental pollution in your community serious? ( <i>zai ni de juzhuqu huanjing wuran zongtishang shi</i> )                                                                                                    | 1: none;<br>2: slight;<br>3: medium;<br>4: serious;<br>5: very serious;          |
| HEALTH        | Are you concerned that environmental pollution brings harm to your life and health? ( <i>ni shifou danxin huanjing wuran gei ni de shenghuo he jiankang dailai yingxiang?</i> )                                                         | 1: not at all;<br>2: slight;<br>3: medium;<br>4: concerned;<br>5: very concerned |
| NEIGHBOR      | To what extent do you think that the neighbors have participated in the actions against the polluting mines? ( <i>ni renwei zhouwei de linju zai hezhong chengdu shang canyu le zhendui wuran qiye de xingdong?</i> )                   |                                                                                  |
| APPRECIATION  | To what extent do you think your environmental activism will be acknowledged and appreciated by society? ( <i>ni renwei ni de huanbao xingdong zai hezhong chengdu shang neng dedao shehui de renke he zansong?</i> )                   |                                                                                  |
| EFFECTIVENESS | To what extent do you think the environmental activism could improve the environmental quality? ( <i>ni renwei huanjing xingdong zai hezhong chengdu shang neng gaishan huanjing de zhiliang?</i> )                                     | 1 = Lowest;<br>5 = highest                                                       |
| SUPPORT       | To what extent do you think the environmental protection bureaus deal with environmental complaints actively and effectively? ( <i>ni renwei huanbao bumen zai hezhong chengdu shang neng jiji he youxiao de chuli huanbao tousu?</i> ) |                                                                                  |
| INTENTION     | In order to improve environmental quality, to what degree are you willing to take actions against polluting mines? ( <i>ni shifou yuanyi weilie gaishan huanjing er dui fujin de wuran qiye caiqu xiangying de xingdong?</i> )          |                                                                                  |

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