Attitudes to Hydroelectricity in Chile:

The Roles of Trust and Social Identities

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To my parents, to whom I owe everything;

and for Ámbar, for whom I aspire to give everything.

Abstract

New large hydroelectricity (hydro) power plants have been characterised as an essential component for Chile's economic development. Rivers are the only locally available natural resource from which a sufficient energy output for the growing national demand can be provided with currently existing technology; additionally, hydro is argued to be comparatively low in terms of economic and environmental costs.

In recent years, the development of new hydro dams has faced increasing opposition from diverse ethnic, environmental, and political groups. Local opposition could be explained in terms of the environmental and societal costs that it bears upon the residents who live near to projects. Additionally, the construction of dams has been previously linked to irregularities prompted by the national government and companies. In a complex socio-political scenario, opposition to hydro has grown to become a national-scale phenomenon.

The aim of this thesis was to provide insights to better understand how people form their views regarding hydro and technologies alike. Previous advances in socio-psychological research and theory, pointed towards three variables to be considered as potential explanations to account for the levels of acceptance of new power plants: *perceived consequences*, *trust in stakeholders*, and *identification* with contextually relevant groups. These issues were examined in four studies: (1) through a thematic analysis of articles in Chilean newspapers; (2) through a correlational assessment of the variables of interest, using a survey focused on the public views on electricity generation; (3) through an experimental study focused on the relationship between *identification with groups* and *trust*; and (4) through integrative theoretical models, using competing structural models.

Results from these studies support the central proposition that people form their views on hydro based on the levels of *trust* that they hold towards stakeholders, and that levels of *trust* are influenced by people's *identification* with dominant and subordinate national *groups*. Moreover, it is proposed that people adopt prototypical *anti* or *pro-hydro* norms from the groups they feel more identified with.

Acknowledgements

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Presentation

This thesis has two overlapping purposes: an applied one, i.e. better understanding the socio-psychological variables that underlie the controversial public opposition towards hydroelectricity in Chile; and a theoretical one, i.e. advancing knowledge about how people develop their views in relation to certain technologies and industrial developments.

The first two chapters outline the background and theoretical rationale that informed the development of this thesis. Chapter 1 provides a general account of the socio-political setting where this research takes place, referring to relevant aspects of the Chilean scenario and their relation to controversies that surround projects for new power plants. Chapter 2 presents the contributions of socio-psychological theories and research that could help to understand the public opposition towards technologies. Variables of interest include the perceived consequences of technologies, trust in stakeholders, and people's identification with subordinate and dominant national groups.

The following four chapters report the empirical studies performed to examine the research questions. Chapter 3 explores the Chilean prototypical norms for dominant and subordinate groups through a thematic analysis of newspapers. Chapter 4 describes a survey study designed to investigate the public opinion on electricity generation sources and examines bivariate correlations and multiple regression analyses on the acceptance of hydro. Building upon previous findings, in Chapter 6, an experimental approach is applied to examine in more depth the interactions between social identifications and trust in stakeholders. Finally in Chapter 6, integrative theoretical accounts are presented and assessed through structural equation modelling.

The thesis ends in Chapter 7, contrasting the initial research questions with the evidence offered through the empirical studies, and examining the suitability of the available theoretical accounts. Implications for psychological theory and energy policy are discussed.

1 The Chilean setting and the controversies of hydroelectricity

"If we try to study attitudes while ignoring the context of real experience, we are left with the hollowness of empty words" (Eiser, van der Pligt, & Spears, 1995, p203)

1.1 Summary

Chile is continuously increasing its demand for electricity, and so it needs to secure a reliable, diverse, affordable, and environment-friendly portfolio for electricity generation. In this setting, hydroelectricity (hydro) is expected to play a large role, as it is carbon-free at the point of generation, and is the only indigenously available source that can currently provide the levels of electricity production required for the base load demand.

The development of hydro projects, however, faces many difficulties, as the most adequate sites for relevant projects take place in areas of a perceived invaluable environmental richness, and in zones that are distant from locations where electricity would be used. Additionally, in the past, developments of such projects have been controversial and related to perceived violations to human rights, especially those of ethnic minorities, who used to live where now dams exist. Currently there is strong opposition to hydro on a national scale in Chile that jeopardises any development and the national security of electricity.

1.2 Introduction

This thesis aims to understand the roots of the opposition towards the expansion of large-scale hydro in Chile, and to provide insights that are generalizable to the theoretical discussion of how people form their views towards the use of controversial technologies and the siting of industrial developments.

Before examining psychological explanations for these phenomena, it is essential to consider the setting in which this research takes place, and from where the guiding questions emerged. In this sense, a characterisation of Chile is provided in terms of its geography, its people, and its politic scenario, and

then, the issues of electricity generation and its surrounding controversies are presented in more depth.

1.3 The Chilean setting

1.3.1 Geography

Located in the South West of the South American sub-continent (Figure 1.1), Chile can be easily identified by its unusual shape, often referred as a *long and narrow strip of land* (e.g. Collier & Sater, 2004). Indeed, while on average it is only ~175 kilometres (~106 miles) wide; from north to south, it is ~4300 kilometres (~2700 miles) long, making it the longest country in the world.

Figure 1.1. Geographical position of Chile

Relative position of Chile in South America (simplified map).

Designed by the author adapting maps from the public domain.

Chile's surrounding geography largely defines the country's current borders. At its western and southern borders is the Pacific Ocean, providing it one of the longer coastlines in the world. To the east, the Andes chain of

mountains is a natural border to Bolivia and Argentina. Finally, to the north, desert areas separate Chile from Peru.

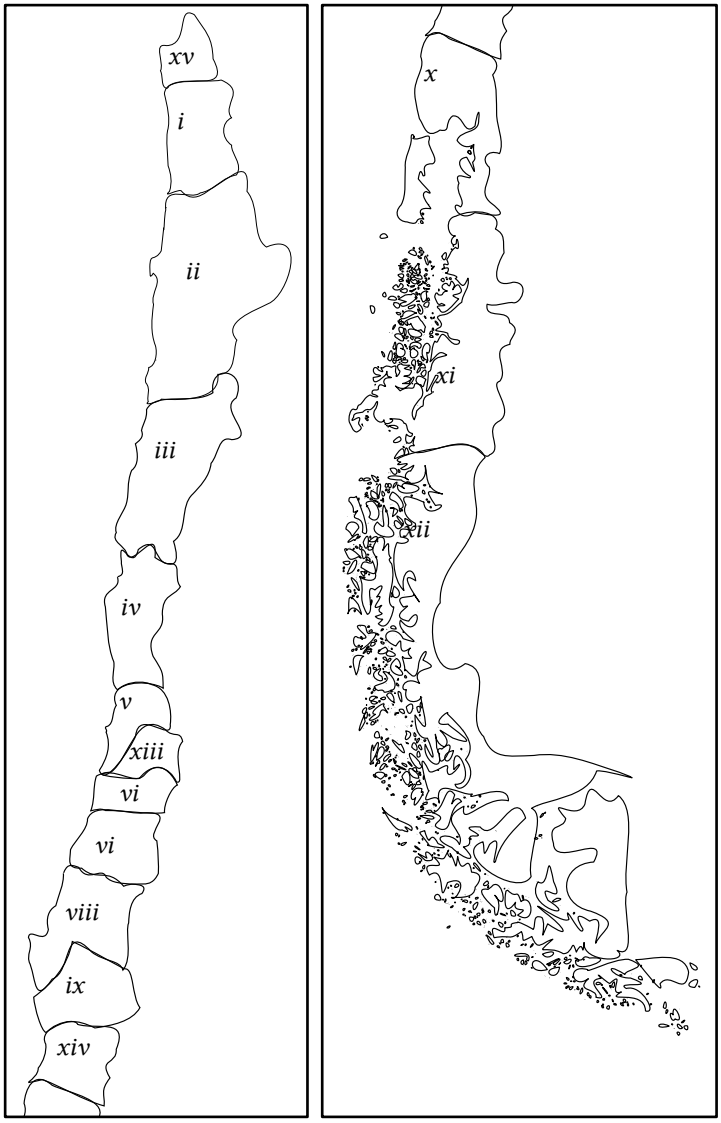
Chile's is administratively organised in 15 regions (Figure 1.2). The shape and location of Chile allow the existence of varied climates ranging from the *Atacama* Desert (the driest in the world) in the far north, to more Mediterranean climates in the central zone, to the alpine tundra and glaciers of *Patagonia* in the far south. In this sense, Chile's length can also be more broadly classified in relation to five natural zones: the far north zone (from xv to iii regions), the near north zone (iv region), the central zone (from v to vii regions), the south zone (from viii to x regions) and the far-south zone (xi and xii regions).

Figure 1.2 Regions of Chile

Position and short names of the regions of Chile (simplified map).

The top of the right panel follows the bottom of the left panel from north to south.

Designed by the author adapting maps from the public domain.



xv: Arica y Parinacota

i: Tarapacá

ii: Antofagasta

iii: Atacama

iv: Coquimbo

v: Valparaíso

xiii: Metropolitan

vi: O'Higgins

vii: Maule

viii: Bío Bío

ix: Araucanía

xiv: Los Ríos

x: Los Lagos

xi: Aysén

xii: Magallanes

1.3.2 People

The total estimated population of Chile is ~17.4 million inhabitants (Instituto Nacional de Estadísticas [INE], 2011), of whom ~87% live in urban settings. Most of the population (~40.3%) lives in the Metropolitan Region (*ix* in Figure 1.2), where the national capital, Santiago de Chile, is located; the remaining population is mostly distributed through the central and south-

central regions (~43.2%), with the remainder located in the regions in the north and south extremes (~16.5%). This distribution reveals a country very centralised around the national capital.

In terms of ethnicity, the Chilean population is understood to be largely composed of three groups: the direct descendants of native indigenous groups, the direct descendants of various European groups, and the descendants of mixed native indigenous groups and Hispanics (*mestizos*) (Lizcano, 2007). Official statistics report that only a small proportion (~4.6%) of the population classifies themselves as part of one of the indigenous ethnic groups of Chile (INE, 2005), of which the most prominent is the *Mapuche* people (~4% of the total population), that currently lives mostly in the south-central regions (viii to x regions), but more recently also in Santiago (xiii region), because of migration.

However, it has been discussed that the official data might under-represent the indigenous groups, because of a methodology that leaves mestizos out of the classification, despite the fact that they could still perceive themselves to be part of the indigenous groups (Gundermann, Vergara, & Foerster, 2005; Haughney & Marimán, 1993). This possible under-representation might be a consequence of a historical disdain that the Chilean state has had regarding the national indigenous ethnic groups, previously having imposed a vision of an ethnically and culturally homogeneous nation (Comisión Verdad Histórica y Nuevo Trato con los Pueblos Indígenas, 2008).

In this sense, many studies have shown that indigenous ethnic groups in Chile are largely excluded from society, being discriminated against, facing the consequences of racism, receiving less years of formal education, lower salaries, and being among the poorest inhabitants of the country (Carruthers & Rodriguez, 2009; Cerda, 2009a, 2009b; Mellor & Merino, 2009; Merino, Mellor, Saiz, & Quilaqueo, 2009; Núñez & Gutiérrez, 2004; Saiz, Eugenia, & Quilaqueo, 2009; Saiz, Rapiman, & Mladinic, 2008; Saiz, 2004). They have also tended to be excluded from the political sphere, and although they had a level of representativeness at some point in the past, it was diffused with many other political Chilean groups in the 1970's due to violent political repression (Collier & Sater, 2004). Nevertheless, until today, many Mapuche groups still fight for

social justice through territorial claims, and demands for gaining participation, and self-determination (Haughney, 2012).

1.3.3 Politics

Background

During the 1960's, Chilean elections for the presidency and the parliament were characterised by three main political tendencies: conservatives (i.e. *Partido Nacional* party), social democrats (i.e. *Democracia Cristiana* party), and a heterogeneous coalition of socialist, communist, other leftist revolutionary parties and humanists, trade unions, and pro-indigenous groups (i.e. the *Unidad Popular* coalition*).* In the context of a nation deeply divided by inequity, the latter group found its way to election victory by positioning their candidate, Salvador Allende, as the first socialist president democratically elected in the world, with the promise of pacifically leading Chile into socialism, for the good of "the people".

The government of the Unidad Popular led a series of social reforms and changes that implied the expropriation of industries, copper mines, lands and other private goods. These reforms met strong opposition from the other political groups, lobbyists, foreign investors, and the Central Intelligence Agency of the United States (in the context of the cold war, considering the links of the Unidad Popular with Cuba and the Soviet Union, see Haslam, 2005; Qureshi, 2009). Internal divisions, boycotts and problems in administration, created shortages in the supply of food and other goods. These situations led the country to a situation of social and civil unrest, and tensions grew from street confrontations between radical leftists and openly fascist right-wingers, to terrorist attacks, failed attempts for a coup d'état, and the assassination of an army commander-in-chief who had stopped the military intervention in any political issues.

In this context, a military junta led by General Augusto Pinochet seized power with the political support of conservatives, social democrats and extra funding and training provided by the US government. In September 11th of 1973, the Army ended violently the government of the Unidad Popular through the air bombardment of the presidential palace, ending up in Salvador Allende's

death, the closure of the parliament and the prohibition of political parties under a state of siege (see Haslam, 2005 for a detailed account of these events).

The junta rapidly discarded most of Allende's reforms and the new government developed new plans and a constitution with the support of right-wing politicians, ideologists, and economists, trained under the teachings of Milton Friedman. In this sense, the military government imposed a free-market economy rationale for areas including education, health, and energy-issues. This led to some economic revitalisation, but maintained the inequalities of the Chilean society.

The dictatorship of Pinochet lasted about 17 years, during which thousands of supporters of the Unidad Popular, new opponents to the junta, and common citizens were murdered, tortured, held in captivity, or sent to exile; and millions lived under political oppression and fear. The growing opposition of the Chilean population, and pressure from foreign organisations, led to a process of social change that ended up in free elections for the presidency and the parliament by 1990.

A new centre-left governing coalition, the *Concertación,* led the *transition to democracy* of the following decades, with presidents of the social democrat and socialist parties. These governments pushed investigations for historic truth regarding human rights violations, and implemented social policies, improving public access to basic goods (e.g. education, health, and housing). However, the pressures of having Pinochet in power as the commander-in-chief of the army (and later as a Senator), and a constitution elaborated by the far right during the dictatorship (with a rigid political system that included non-elected permanent senators, which happened to be ex-members of the army, and a voting system that in overall over-represented the votes of right-wingers), impeded the *Concertación* from achieving a majority in the parliament to promote greater structural changes (for example see Arrate, 2004; or Collier & Sater, 2004, for summarised accounts on this period).

Actually, quite the opposite, the governments of the Concertación followed many of Pinochet's guidelines, leading the privatization of state-owned companies, and strengthening the role of privates through financial

support and subsidies. In this sense, while the Concertación was successful in guiding Chile's transformation into one of the leaders of South America across many indices of economic performance and average societal wellbeing, the inequity levels were maintained, leaving Chile as one of the most unequal countries in South America and the world, with few opportunities for the underprivileged (Núñez, 2011).

Current issues

In 2009, Sebastian Piñera, right-wing politician and billionaire (one of the 5 Chileans in the *Forbes* list of the World's Billionaires 2012), was elected to be the first right-wing politician in power, after two decades. Some sociologists have described the election results as not a triumph of the right-wingers, but a defeat of the Concertación (e.g. Gutierrez, 2010), i.e. the results are better explained not because the right-wing candidate received more proportional support than in previous elections, but instead, because the centre-left coalition received fewer votes. Emerging public leaders and political groups that classify themselves outside the traditional Chilean political spectrum support this notion, because, they state, the political system failed to deliver substantial changes to deliver representation and benefits for the majority of the population (e.g. Enríquez-Ominami Gumucio, 2011).

In this sense, inequities in income, education, and health, have motivated, especially in the last years, massive public protests to request for substantial changes, gathering thousands of supporters in each of the major cities of Chile. The demonstrators consist of groups publicly disengaged from the traditional current political groups, and many of which who identify themselves with anti-establishment, anti-capitalist, and pro-ethnic minorities' discourses; and have been proposed as a form of reconstitution of the collective action after decades of repression (Rice, 2010), sharing much of the discourses of the *Unidad Popular*.

In the context of public protests and anti-establishment groups, these discourses mix with inequities associated with geographically isolated groups and ethnic minorities; and with issues of environmental protection as well. In this sense, for example, in public demonstrations for education issues, it is common to find forms of explicit opposition to environmentally controversial

projects. Conversely, it is also common in protests regarding environmental issues, to find expressions of support for the plight of students, or to find waving flags of indigenous groups.

In this socio-political context, the development of hydro projects has faced great political support from the traditional political groups, but great public opposition from a substantial number of protesters. The following sections look in more detail at the specific electricity-generation context.

1.4 Electricity generation

The economic growth of Chile has required a steady increase in the demand for electricity. The subsequent national governments and international experts have stated that securing the production of considerably more electricity is required to keep a positive economic trend. In this sense, they argue that a large number of new power plants is required, and that these should be based on a diversified range of energy sources. Such diversification should aim to keep the carbon-emissions as low as possible, considering the global environmental situation; while also ensuring energy security, especially considering some recent energy crises (Comision Nacional de Energía [CNE], 2008; International Energy Agency, 2009 [IEA]; Ministerio de Energía, 2012).

These energy crises refer to electricity shortages of the last decade (2000-2010) that were encountered for multiple reasons. These include climatic seasons of great drought in the central zones that made hydro power stations less efficient than expected; and the decisions of Argentinean authorities to stop the delivery of natural gas to Chile when their cities faced energy shortages during winter (CNE, 2008). In this context it has been suggested that an increase in many forms of traditional and new renewable electricity generation is needed, but it has been especially emphasized that an increase in large-scale hydro is most critical for the Chilean situation (IEA, 2009), because of being nationally available (as opposed to relying on imports).

1.4.1 Portfolio of electricity generation

As of February 2012, the matrix for electricity generation was composed of 63% fossil fuels (mostly coal and natural gas), 34% hydro, and 3% new

renewables (mostly wind). The current government has proposed a target to change this scenario, such that by 2024, 10% of national electricity generation should come from new renewables, and ~45% from hydro. Meanwhile, although nuclear power has been the topic of national discussion, and feasibility studies for the deployment of nuclear plants have been conducted, the current government has opted to delay any decision in that respect and leave it for future governments to be decided (Ministerio de Energía, 2012). For all the above reasons, many studies have been conducted in order to identify the best places to build new hydro power stations in Chile, and so, electricity generation companies have been actively encouraged to propose projects to supply the growing demand.

1.4.2 Main companies and their owners

As of 2008, around 35 companies contributed to Chile's main electricity network, however over 90% of the installed capacity belonged to three holdings: *Endesa*, *Colbún* and *AES Gener* (CNE, 2008). Endesa was a national state-owned company; however, it was privatized in the 1990's and became a subsidiary of the larger international Spain-based Endesa. On the other hand, Colbún is largely owned by two Chilean economic groups (*Matte* and *Angelini*). Finally, AES Gener is owned by US-based *AES Corporation*, and has strong ties with the mining industry, and through it, with the Chilean *Luksic* group.

It is worth noting that the Matte, Angelini and Luksic economic groups, correspond to three small Chilean families that represent 3 of the 5 Chilean entries that appeared on the Forbes' list of the World's Billionaire's 2012 (i.e. the richest families in Chile). Their fortune and power is such, that they have been called the *owners of Chile* by some analysts (Carmona, 2002) and many critics; although this title comes from declarations made by an ancestor to the Matte group more than a century ago:

> *"We are the owners of Chile, the owners of the capital and the land; the rest are just suggestible and sellable masses. Their opinions or reputation do not count"*[1].

1.4.3 Consequences of Hydro

Hydro is currently, for Chile, the only available indigenous energy source capable of contributing reliably to the base-load demand for electricity (CNE, 2008). Once a large hydro power plant is working, it is a cheap, renewable and carbon-free source of electricity generation. Even if the full life-cycle of large hydro stations is taken into account, they still show total emissions of greenhouse gases that are between 30 to 60 times less than those of fossil-fuel powered plants (Gagnon & Vate, 1997).

On the other hand, the construction of large-scale hydro power plants (above 30 MW), usually requires large modifications to the course of rivers, the constructions of dams, implying the use and inundation of large areas of land. In this sense, typically debated negative consequences regarding hydro relate to habitat and ecosystem destruction, emissions from reservoirs (like methane), water quality, sedimentation, and the political, societal and economic costs of relocating inhabitants of areas where power plants are built (McCartney, 2009; Sovacool, Dhakal, Gippner, & Bambawale, 2011; Sovacool, 2009).

Considering the benefits, but also the long list of problems that the expansion of hydro can imply (see Table 1.1), the World Commission on Dams

[1] Eduardo Matte Pérez, ancestor to the Matte group, in 1892 (in Carmona, 2002, p116). Translation made by the author.

proposed a list of recommendations for the development of hydro projects. Among these, the notion that any proposed development of a hydro project should incorporate the principles of democracy it is highly salient and repeatedly mentioned. This implies considering the participation of the people who can be affected by such projects, and of the general population through policies that represent the views of a wide spectrum of groups, avoiding an only top-down-driven approach of decision making in these respects (World Commission on Dams [WCD], 2000).

However, it has been noted that these recommendations have not been accepted yet by some major global institutions (e.g. World Bank) and governments of countries that develop the greater numbers of large-scale hydro power plant, i.e. China and India (Fujikura & Nakayama, 2009). The following description of Chile's past and present approaches to hydro reveals that its case is not an exception in this respect.

1.4.4 A controversial past

Chile was highly reliant on hydro from long before democracy was broken and then re-established. However, the earliest salient controversies surrounding the development of hydro projects emerged in the early 1990's, around the time when the *Pangue* Dam was constructed, and the *Ralco* Dam was formally proposed, both in the centre-south area of Chile, in the rural Alto Biobío zone (in the viii region).

Endesa started feasibility studies for these dams during the military dictatorship, in the 1980's, while it was still a state-based national company. By that time, these studies and their results were not made known to the public or to the people who lived in the area (Aylwin, 2002). However, they sparked wide controversy when they were commissioned during the 1990's and early 2000's, principally because their construction resulted in the flooding of large areas owned by communities of the Mapuche-Pehuenche ethnic minority, and the relocation of these people.

The Pehuenche

The Pehuenche are a subgroup of the Mapuche ethnic group in Chile. In their language, Pehuenche means people (*che*) of the pine nut tree (*pehuén*).

They are characterised by a culture in which they are symbiotically united to nature, and depending on it for its continuity (Orellana, 2005). In practical terms, this means that their subsistence, traditions and religiosity, as partially suggested in Figure 1.3, are built upon unrestricted access to natural renewable resources of the forest (Aylwin, 2002; Cuadra, 2011).

For the Pehuenche, a specific type of pine nut is used as a source for flour, milk, alcohol, and for feeding animals. This fruit is so central to their lives that its tree, the *pehuén* is considered sacred (Nesti, 2002). This tree, scientifically named *Araucaria Araucana* (often referred to as *monkey-puzzle* tree in English), is native to south-central Chile (and part of Argentina), and large quantities of them can only be found in limited areas of the Bío-Bío, Araucanía and Los Lagos regions, as shown in Figure 1.4.

Figure 1.3 Drawing of a Mapuche myth

Drawing portraying the story of *Tren Tren* and *Kay Kay*, a myth of the Mapuche people.

The branches on the left represent the pehuén tree. The myth tells that the "earthly snake" defended the zone against the "water snake" and its threatening of flooding all the land (explaining the local geography).

Drawn by a Pehuenche child in the rural Alto Bío-Bío zone (2012).
Photograph by María Amelia Sepúlveda. Used with permission.

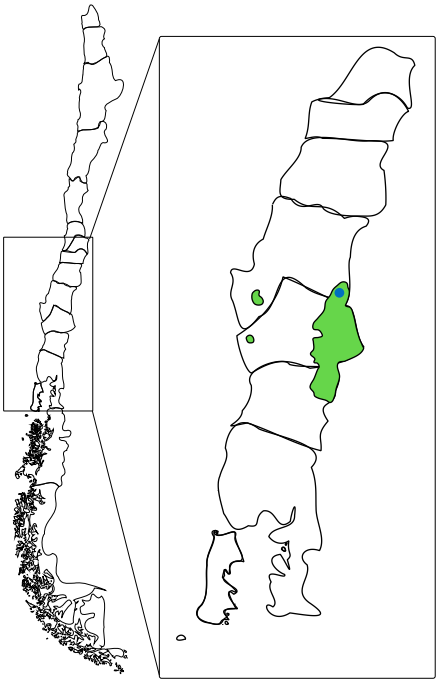
When Pehuenche communities learnt about the proposals for dams in their territory, they organised themselves to develop local opposition to the projects. They gained notoriety in the national discussion and developed links with human rights associations and national and international environmental groups, such as the Indigenous Environmental Network, the International Rivers Network, the Global Justice Ecology Project, Amnesty International, and Human Rights Watch, among others (Carruthers & Rodriguez, 2009). Negotiations only allowed them to obtain better compensations (Departamento de Derechos Humanos y Estudios Indigenas, 2000), but they were ultimately not successful in stopping the construction of the dams.

Figure 1.4 Location of the Araucaria Araucana and hydro dams

■ Approximate areas where the Araucaria Araucana is found naturally in Chile.

● Approximate location of Pangue and Ralco hydro dams.

Made by the author adapting maps from the public domain and using data from http://www.chilebosque.cl/ (as of October 1st, 2012).



By the time that Pangue and Ralco Dams were operational in 2004, more than 700 Pehuenche people had been relocated[2] to an area where free and natural access to the fruits of the *pehuén* and other resources was no longer granted. Their previous habitat, together with places of significant cultural value, such as ceremonial places and cemeteries were flooded (Orellana, 2005).

[2] Pangue Dam was finished in 1994, its power station has an installed capacity of 450MW, and its construction implied the flooding of ~500 hectares and the relocation of ~100 Pehuenche. Ralco Dam was finished in 2004, its power station has a capacity of 570MW, and its construction implied the flooding of ~3500 legally Pehuenche hectares, and implied the relocation of ~675 Pehuenche.

Moreover, there have also been some reports that the promised compensations might have not taken place[3].

This process has been characterised as a cultural genocide and as a violation of human rights by national and international organisations (Departamento de Derechos Humanos y Estudios Indigenas, 2000; Orellana, 2005). It has also been described that, through the process, the law was either ignored, or that special arrangements were made by the main stakeholders to find loop holes that allowed it (Aylwin, 2002).

Endesa, the World Bank, and the government

Endesa has been largely criticised for its development strategies. For example, although they were always interested in building the two Dams, they only submitted for evaluation, one at a time, using the Pangue Dam as a "foot in the door", for the later construction of the Ralco Dam (Orellana, 2005). Furthermore, interviews with Pehuenche people and other relevant actors of the time, have suggested that the company deliberately aimed to reduce opposition through the use of lies, rumours, bribery, and by providing alcohol, all in an effort to divide the Pehuenche communities (Aylwin, 2002).

Some authors have linked the Spanish nationality of Endesa to their conflict with the Pehuenche, suggesting that they embody a new form of the *Spanish-Conquistadores* (Namuncura, 1999), a notion that might also be held by members of the public (see Figure 1.5 for example).

[3] As shown, for example, in the documentary film *Switch off* (in Spanish: *Apaga y vámonos*) by Manel Mayol (2005).

Figure 1.5 Electricity generation companies as Spanish "conquistadores"

"Descubiertos!", a cartoon portraying a dialogue between Christopher Columbus and Rodrigo de Triana in the so-called "discovery of the Americas".

The upper text reads: "I see hooded people with weapons, molotov cocktails, and too many opposing websites. I don't see them too interested in being discovered!", and the lower text reads: "This is what we get for having Endesa as our sponsor!".

Originally published in Azkintuwe (2008), Mapuche newspaper.
Drawn by Pedro Melinao. Used with permision.

Endesa's success would have not been complete without the support of international agencies and the Chilean government of the time. For example, the World Bank gave financial and political support for the development of the projects. Also, a pragmatic approach of the government of the epoch, highly favoured the construction of the dams in the name of *progress* and *public interest* (Aylwin, 2002; Orellana, 2005).

The involvement of the government was such that it violated the notions of open markets in energy that are supposed to operate in Chile. For example, one must consider that at different stages of the environmental assessment, the

project was considered inadmissible by diverse regional and local authorities, because of technical issues (e.g. lack of consideration for risks of releases of water, earthquakes, and volcanic eruptions), because of its environmental and social consequences, and because it violated indigenous-related laws.

It has been suggested that challenges for the project were solved personally by President Eduardo Frei[4], who himself requested the resignations of principal authorities that opposed the project on more than one occasion, until an agreement was found for building the dams (Orellana, 2005). This notion is supported by recent declarations of Frei, who, while defending his support for currently controversial electricity generation projects, stated:

> *"When you are the government, you are there to make decisions. When Ralco and Pangue were built, my hand did not tremble. We would have had electricity shortages if we did not have them"[5].*

In this sense, it can be assumed that such decisions and interventions were made on the grounds of energy security and under the rationale of the *public interest* and the *greater good*.

Aftermath

After the dams were built, official governmental analyses of the process shared the view that they had been developed unlawfully and without proper consideration of the cultural and social consequences. These new considerations led to further events, such as the ratification of Convention 169 on Indigenous Peoples Rights by the Chilean senate, and the promulgation of measures to ensure environmental protection of areas, such as prohibiting other hydro projects in the Biobío region (Orellana, 2005).

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[4] In Chile's political system the president has been characterised as the "*de facto* agenda setter" (Aninat, Landregan, & Navia, 2006, p6).

[5] Eduardo Frei. during the last televised debate of 2009, for the Chilean presidential elections. Translation made by the author.

1.4.5 Current controversies

As described previously, Chile's plan for economic and social development includes the expansion of hydro, including geographical areas where it has was not needed before, most of them in the south of Chile. This interest has been transformed into numerous proposals of projects and large forms of private economic investment.

Many of these projects have caught the attention of public discussion and the media, some of them because they have raised concerns, being that they are planned again in lands of the Pehuenche (the *Angostura* project, in the same river as the Pangue and Ralco dams, right next to where the legally indigenous land ends, but where a small number of Pehuenche still live), or next to other Mapuche groups, such as the *Lafkenche* people ("people of the lakes" in the Mapuche language), and others because of the anticipated magnitude of their environmental consequences.

Among these projects, the one that has caused most controversy is *HydroAysén*, the largest hydro project ever proposed in Chile, which consists of various power plants built across the Baker River in the Aysén Region, in the Chilean Patagonia, in the far-south. The project is carried out by a joint-venture between Endesa and Colbún. Its supporters claim it will bring benefit to consumers by avoiding the increase in energy prices, and by displacing the use of coal (e.g. Raineri & Contreras, 2010). Plus, in the areas where these projects are proposed, the displacement of people is minimal in comparison to previous projects.

A list of reasons as to why this and other projects should not be constructed has been announced by academic and lay opponents, as laid out in Table 1.1. At the local level, these include concerns about threats to the biodiversity of the siting location, the desire to preserve wildlife reserves (Hall, Román, Cuevas, & Sánchez, 2009); the destruction that the construction of these dams imply, and local consequences on local-based economy activity based on tourism (Comisión Ciudadana-Técnico-Parlamentaria para la Política y la Matriz Eléctrica [CCTP], 2011).

Table 1.1 Consequences of hydro

Advantages	Disadvantages
Environmental	
Lower-CO_2 emissions than fossil fuels	Large modifications to rivers Flooding of large areas Ecosystem destruction Decrease in biodiversity Reservoir gas emmisions Water sedimentation Construction disruption
Economic	
Cheaper than alternatives Growth in mining industry Creation of jobs Subsidies for municiaplities Activation related to migration Reduced reliance on energy imports	Harm on tourism development Strenghtening energy-monopolies Neglecting alternative development
Societal	
Consistency of electricity supply Integration through new roads Recreational use of reservoirs	Relocation of inhabitants Local crime due to migration Threatens local cultures Controversial use of controversial lands Politically unpopular Risks of flooding Indirectly promoting inequity

On a national level, the HydroAysén project is also criticised because it would involve building a long line of transmission pylons to connect them with the existing grid system. These would comprise over 5000 towers, creating the longest transmission line in the world. Building these towers would result in disruption of ancient forests and fragmentation of ecosystems (Vince, 2010); and they would pass through lands which are already controversial because of territorial disputes between the Mapuche and non-Mapuche landowners (Toledo & Aravena, 2009).

Other criticisms include more socio-political aspects, such as highlighting that most of the electricity would not be for household use, but for foreign privately owned mining concessions that benefit from Chile's national resources. In this sense, the projects for which its electricity would be of use include other already controversial ones, such as the Pascua-Lama mining site

in development by Barrick Gold, and it has been suggested that these aspects are at the core of the massive standoff (Vince, 2010).

Moreover, the current government has been criticised because of potential conflicts of interest in relation to the electricity scenario, e.g. Endesa provided millions of dollars for a foundation led by the presidents' wife, and her brother (i.e. the presidents' brother in-law) was part of the directory of the HydroAysén project. This is mirrored, for example, in declarations by the Interior Minister, who has firmly stated during 2011 that it would be beneficial for the country to get HydroAysén approved, despite the fact that the central government is not supposed to intervene in such processes.

From local to national and global opposition

As mentioned before, during the Ralco and Pangue dams' controversies, Mapuche protesters developed sophisticated links to human right activists, environmentalists, scholars and other indigenous groups (Carruthers & Rodriguez, 2009). These links to other groups may have strengthened the concerns about hydro in general, and could have served as the basis for more organised forms of dissent.

In comparison to the times of the Pangue and Ralco Dams controversies, the opposition to new projects, like HydroAysén, is larger, and the involved groups are far more heterogeneous, including not only indigenous groups, human-rights activists and environmentalists per se, but also a number of dissident politicians, citizen-based groups, and academics, among others. The *Patagonia without Dams* organisation has been in the centre of the opposition, gaining media-coverage ranging from local, national newspapers to international magazines and academic journals (e.g. Vince, 2010). In this sense, hydro has become very controversial in the public sphere, and in 2010 only around a 17% of the Chilean population was found to express support towards the deployment of any new hydro project (Ipsos Public Affairs, 2010), and thousands of Chileans have expressed their opposition toward the project in massive protests in many of the major cities of the country (e.g. Santiago, Valparaíso, Concepción, Temuco).

1.5 Conclusions

To ensure the prosperity of Chile, consecutive governments have expressed the need for building new power plants, to supply the growing electricity demand, of which hydro projects are currently the most crucial ones. Companies have proposed projects that would take place in new areas where enough water would be ensured, but these are far from main cities and from where the use of electricity would take place, and where the environment is still preserved as mostly unaffected by human presence.

These projects have sparked controversy and vocal opposition from many groups within the national population, principally because of their large environmental consequences. However, in addition, a background history of conflicts between ethnic-groups and electricity-generation companies, in relation to a complex socio-political context of inequity, exclusion and social protest, suggest additional motivations for why a large number of people oppose hydro projects so fervently.

2 Socio-psychological aspects of the acceptance of technologies

2.1 Summary

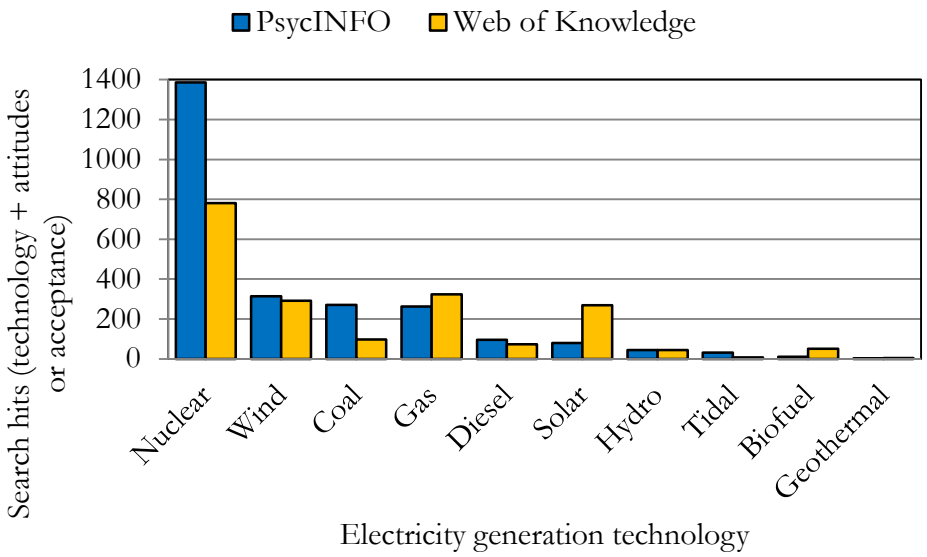
Since there are not many empirical studies that have examined the formation of public opinions about hydro, a wide spectrum of socio-psychological research and theory is taken into consideration. In this respect, it has been suggested that people's acceptance of electricity generation technologies are formed on the basis of the perceived consequences of the use of these technologies. Additionally, it has been proposed that when people do not have enough information, they might rely on whether or not they trust the institutions that are associated with the development of the technology. Moreover, considering the social context of the research, it is proposed that social identification with certain groups (e.g. the Mapuche people) might influence how people develop their views on hydro.

2.2 Introduction

In spite of the relevance that the public opinion about hydro has had in the Chilean political scenario outlined in Chapter 1, there has been relatively little national social research in this respect. More generally, there is a lack of research into public attitudes towards hydro which is illustrated by comparing to how perceptions of other electricity generation technologies have been studied before (see frequencies of search hits found in two prominent academic search engines in Figure 2.1[6]).

[6] N.B. Search results as of the 2nd of April, 2012. Search queries were performed for each type of technology in Figure 2.1 on each engine. Key terms were defined for each technology, and it was requested through Boolean operators that these words appeared somewhere in the text of academic articles plus the words "electricity", and "attitudes" or "acceptance". The same words were used for a web-search for one of this thesis' studies and can be in Table 3.2. Similar trends were observed in other search engines (e.g. Google scholar) and using words in Spanish.

Figure 2.1. Search hits for electricity generation technologies



Considering that hydro has been used for more than a century, the absence of more social studies in relation to it (only ~44 search hits, of which no more than 10 actually explore the acceptance of hydro), could reflect that its acceptance in the past has been neither too relevant nor controversial to be of concern for academic inquiry (contrary to other electricity generation sources such as nuclear and wind). On the other hand, this could also reflect that in many countries, many of the large dam building developments took place many years ago, whereas controversies around nuclear and wind power are in some ways more contemporary political debates worldwide.

Bearing in mind the lack of psychological research, it was deemed necessary to explore a wider body of literature to identify accounts of how the formation of public opinions can be better understood (while still incorporating studies on hydro). In this sense, broad attitudinal theories provided a background about cognitive and affective processes that might underlie acceptance of technologies. More specifically, studies on risk perception and on the acceptance of technologies provided contributions from applied perspectives focused on the study of the public's views on industrial projects and related policy-making. Finally, theories of intergroup relations offered an approach to explore how groups and social contexts can influence how

individuals form their views towards attitudinal objects (e.g. industrial developments as hydro power plants).

In the following sections, a general review of attitude theory is provided, followed by a more specific analysis of applied research focusing on perceived consequences that might guide people's views about technologies, and on the trust in stakeholders on which people might rely when they assess these issues. Additionally, a perspective on how intergroup relations and social identification might play a role in these phenomena is presented.

Finally, having reviewed all these themes, a discussion of how these themes might overlap and relate to each other is provided to propose comprehensive explanatory models, and the research questions with a plan that led to the empirical studies of this thesis.

2.3 Background

Research into the public acceptance of technologies has been influenced by the psychological study of attitudes, and many variables within these studies could be explained in terms of their underlying attitudinal nature (Eiser, Miles, & Frewer, 2002). As such, it becomes crucial for the research in this field to take notice of broad literature in relation to the socio-psychological construct of *attitudes*.

Attitudes are a central part of social psychological research, and can be understood as psychological tendencies of favour or disfavour to an object (or concept) that are stable through time (Eagly & Chaiken, 2007). The nature of attitudes has been the issue of wide research and discussions (Ajzen, 2001; Albarracín, Wang, Li, & Noguchi, 2008; Bohner & Dickel, 2011; Crano & Prislin, 2006; Petty, Wegener, & Fabrigar, 1997); a prominent view of how attitudes are structured and formed, proposes that they comprise an affective and a cognitive component (Eagly & Chaiken, 2007). Their affective component refers to an emotional evaluation experienced in relation to the object, and conversely, the cognitive component consists of beliefs and thoughts held in relation to such object.

A prominent approach in the study of attitudes is the expectancy-value model (Ajzen, 2001; Fishbein & Ajzen, 1972), which proposes that attitudes are

the result of cognitive mental calculations based on beliefs about the object, and on how the evaluation of such beliefs fits or does not fit with the individual's values. This conceptualization implies that incorporating more positive beliefs (which are perceived as relevant) in relation to an object, should lead to more positive attitudes towards it; on the other hand, negatively charged beliefs, should lead to more negative attitudes. While the proponents of this model hold the view that the affective aspect of the attitude is central, their approach implies that when people develop their attitudes, they are capable of performing complex mental algebra considering the perceived features of the object and their personal values.

Alternative attitudinal theories have observed that, under certain circumstances, people will develop attitudes towards objects even in the absence of beliefs about them. In this sense, in his seminal paper, Zajonc (1980) proposed that sometimes *preferences need no inferences.* In this type of approach, attitudes are considered mostly affective, and beliefs in relation to the object, can emerge as a consequence of such affects (Zajonc, 1984).

Other approaches have integrated the roles of beliefs and affect into a single component, for example, in the associationist view proposed by Fazio and colleagues, attitudes are considered *object-evaluation associations* that are learnt and stored in memory (Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Fazio, 2007). In this sense, attitudes are not understood as the result of calculations made in relation to beliefs; but neither are they the result of a purely affective experience stripped of cognition. Instead they are understood as a single factor *summary evaluation* which can include cognitive, affective and behavioural forms of knowledge.

These *associations* are understood to vary in terms of their evaluative tone (negative-positive continuum); in terms of the nature of their evaluation (cold-hot continuum, i.e. more-cognitive vs. more-affect based); and in terms of the strength of their associations (nonattitudes-attitudes continuum, i.e. weak and unstable attitudes vs. strong and stable attitudes).

Considering other approaches in the study of attitudes, the common ground in most current theories is that there are relevant roles for both

cognitive and affective processes; and that the prevalence or the importance of each of these will depend on personal and situational factors, so that under certain circumstances people's attitudes will be characterised as automatic, heursitic and affective; whereas in other cases they can be more cognitive-focused, and the result of thoughtful deliberation (Bohner & Dickel, 2011; Eagly & Chaiken, 2007; van den Berg, Manstead, van der Pligt, & Wigboldus, 2006). In the same sense, developments on persuasion and attitude change have shown that attitudes can be formed, changed and influenced by both thoughtful deliberation and by more spontaneous heuristic processes (Albarracín et al., 2008; Olson & Zanna, 1993; Petty et al., 1997; Wood, 2000).

2.3.1 Perceived consequences

In line with attitude models based on deliberative processing of information, which focus the role of beliefs, a prominent explanation for the origins of acceptance (or opposition) is found on people's views about the perceived consequences of the target-technology. In this sense, if people believe that positive consequences will be the output from the use of a technology, they could be expected to hold positive attitudes towards it (Ajzen, 2001; Fishbein & Ajzen, 1972).

Early examples of the use such approaches for understanding people's attitudes towards electricity generation sources are found in studies by Otway and Fishbein (1976) and by Eiser and van der Pligt (1979). Both studies looked at the public views in the nuclear-energy debate of the 70's in the US and UK respectively. Both studies found support for the notion that beliefs are relevant for predicting attitudes towards nuclear power.

Eiser & van der Pligt (1979) noted that different aspects were salient for opponents and supporters. In this sense, the attitudes of pro-nuclear subjects were better predicted by perceptions of economic benefit, while the attitudes of anti-nuclear subjects were associated to perceptions of social and political risks.

Using a similar approach, Thomas et al. (1980), found that hydro in the US was perceived comparatively more favourably than other sources (nuclear, coal, oil; but not solar), and described that the tendency was for individuals to believe

that this technology was linked to high economic benefits and low environmental, psychological, indirect and physical risks.

Research under the 'psychometric paradigm' of risk perception (Fischhoff, Slovic, Lichtenstein, Read, & Combs, 1978) proposed a number of perceived features of technologies to be predictive of their acceptance. Among the main findings of this widely used approach is that two types of perceived features (the *unknown* and *dread* factors) can account for much of how acceptable a technology is considered (Slovic, 1987). These types of features refer to the perceived newness and how well known is the technology; and the perceived catastrophic potential, worry and fatal consequences of its use.

In this sense, according to this approach people would oppose nuclear because of perceiving it as a not well-known technology, and because of fears linked to the because of the potential of death and catastrophes (Slovic, 1987). In contrast, a very different profile was characterised for hydro in the US, where it was perceived to be a comparatively well known, controllable technology with few ecological consequences and was, hence, viewed favourably[7] (McDaniels, Axelrod, Cavanagh, & Slovic, 1997).

In terms of technology acceptance, studies by Sjöberg and colleagues have found additional predictive value from other perceived consequences and characteristics of a technology, such as *tampering with nature* (Sjöberg, 2003b) and *severity of consequences* (Sjöberg, 1999, 2000). Many subsequent studies have applied similar approaches to the study of technology acceptance, and have explored the predictive value of the specific beliefs that people have regarding electricity generation technologies; encountering similar findings to those of earlier approaches. Among these, some examples of people's perceptions that have been recently identified as predictors of attitudes towards electricity generation sources and related technologies include: *environmental harm*, *energy cost* and *personal risk* for attitudes toward coal,

[7] One must consider that these perceptions could vary across societies and historical moments. In this sense it is natural to question whether these beliefs in the US of the 1990's would be similar to the beliefs held in Chile nowadays.

natural gas, nuclear and wind power in the US (Ansolabehere & Konisky, 2009); *economic benefit*, *cheaper electricity*, *landscape spoilage*, *detriment in house-value*, for attitudes toward wind power in local communities in the UK (Jones & Eiser, 2009); and *leakage effectiveness* (Itaoka, Okuda, Saito, & Akai, 2009) and *environmental inference* (Tokushige, Akimoto, & Tomoda, 2007) for Carbon Capture Storage (CCS) in Japan[8], among others.

In this sense, while *perceived risk* (and related measures) has been the centre of much research regarding energy technology acceptance; the public concerns for hydro, as outlined in Chapter 1, appear to refer to a wider number of aspects associated to its development (i.e. environmental, economic and societal consequences), rather than on risk per se (McDaniels et al., 1997; Sovacool et al., 2011; Thomas et al., 1980). Therefore, when exploring these aspects, it seems more adequate to consider a broad approach that encompasses a wide range of potentially *perceived consequences* rather than measuring a single aspect.

One aspect to notice is that, in objective terms, negative *consequences* are not necessarily negatively related to positive *consequences,* in fact they can be positively associated, i.e. the use of many technologies can be simultaneously beneficial for one aspect and detrimental on other (e.g. good for the national economy, bad for the local environment). However, when people are asked to make judgements in this respect, their responses reveal that they tend to perceive that these are inversely correlated, e.g. the tendency is for people to perceive that nuclear power is either beneficial or risky, but not both (cf. Alhakami & Slovic, 1994).

To provide an explanation for this type of observations, Slovic and colleagues proposed that peoples' assessments are guided by automatic affective reactions to the technologies or hazards; phenomena for which they coined the term *affect-heuristic* (Finucane, Alhakami, Slovic, & Johnson, 2000;

[8] These and other similar studies, in general do not necessarily engage explicitly with the views of certain attitude models; but their emphasis on certain perceived features or properties of the technology mirror an approach to attitudes in which these are constructed on the basis of beliefs.

Slovic, Finucane, Peters, & Macgregor, 2002; Slovic, Peters, Finucane, & Macgregor, 2005; Slovic & Peters, 2006).

Such an approach has been used to explain and understand public views about electricity generation sources, for example, in the context of attitudes toward wind and gas power in local communities in Poland, where Eiser, Aluchna, and Jones (2010) proposed that people's arguments were better understood as justifications for preferences that they already had (which were based on political issues of the context) as opposed to the result of thorough consideration of the features of these technologies. In this sense, it might be the case that some perceived *consequences* of hydro could also be explained in terms of views that people have developed previously (e.g. people might argue that hydro is economically detrimental for the nation as the result of having previous strong negative attitudes towards the technology, which could be based on environmental or societal concerns instead).

The development of the *affect-heuristic* concept and similar approaches (Loewenstein, Hsee, Weber, & Welch, 2001; Slovic, Finucane, Peters, & MacGregor, 2004) marked a shift in the focus of explanatory models in risk perception. In particular, inciting the study of affect processes, influenced by the developments of Zajonc (1980) in attitude theory, in an area that until then was largely dominated by cognitivist explanations (Finucane et al., 2000).

This is not to imply that peoples' views are founded on mere emotions, irrationality and ignorance, as has been the concern of some scholars with this theory (Sjöberg, 2006; Wardman, 2006); but instead, as proposed by Slovic (1993), it suggests that people's preferences might be the result of complex social processes where, for example, certain uses of technologies might promote people's distrust of risk managers and proponents of technologies (and this might impact negatively on how people perceive the use of such technologies).

2.3.2 Trust in stakeholders

Trust in stakeholders has been much researched as a predictor of the perceived *consequences* of a technology and its *acceptance*. It is proposed that when people do not have much information about a technology, they might rely

on the trust they have in groups and institutions associated with its development to form their attitudes.

In this sense, it is proposed that how much trust is held in stakeholders, communicators or managers related to technologies, might be used as a cue for inferring whether such developments can be considered to be risky and detrimental and/or safe and beneficial, and therefore affecting on whether people consider if it is acceptable or not; as in a *causal-chain model* (Siegrist, 1999, 2000), see Figure 2.2. In this sense, it has been observed that higher levels of trust are associated with increased levels of benefit perception, and a reduction of perceived risk.

In Latin American countries, Bronfman and colleagues have reported the same trends in relation to many technologies, such as nuclear and solar power (Bronfman, Vázquez, & Dorantes, 2009; Bronfman, Vázquez, Gutiérrez, & Cifuentes, 2008; Bronfman & Vázquez, 2011), and recently, in the Chilean context of electricity generation, including hydro (Bronfman, Jiménez, Arévalo, & Cifuentes, 2012).

A considerable amount of effort has been spent clarifying the structure of people's trust in institutions, to elucidate what is meant when studies refer to the concept of trust. Although there is a wide variety of terms for studying trust, much work shares a consensual view based on two dimensions: *calculative-trust* and *relational-trust* (Earle, 2010a). The first, also referred to as *confidence* refers to an estimation of how capable or skilled is the target; while the second, also called *benevolence*, or simply *trust,* refers to how well-intentioned or looking for the common-good is the trust-target. Research has shown that in Chile, generic trust in institutions is largely defined by both aspects (Segovia, Manzi, & Carvacho, 2008).

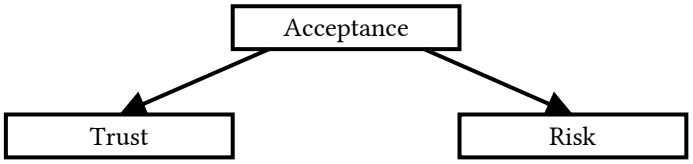
Some asymmetries and biases have been found regarding how trust is formed. For example, it has been observed that trust is higher when others are perceived to share similar values (Siegrist, Cvetkovich, & Roth, 2000). Other findings show that people tend to trust more in communicators when they report negative issues, i.e. a negativity bias (Eiser & White, 2005; Poortinga & Pidgeon, 2004); and when the views which are expressed match the prior

attitudes of the perceiver, i.e. a confirmatory bias (Poortinga & Pidgeon, 2004, 2006; White, Pahl, Buehner, & Haye, 2003). As well, it has been proposed that trust is easily lost through acts of betrayal; and that it is very difficult to regain (Slovic, 1993).

In line with a confirmatory bias, an alternative explanation to the causal-chain model has been proposed by Eiser et al. (2002), and supported by Poortinga & Pidgeon (2005), suggesting that under certain circumstances, people's reports of *trust* and perceived *consequences* (i.e. perceived risk) could be understood to be an manifestation of their prior views on the subject. In this sense, this *associationist model of trust* (Figure 2.2), suggests that measures of trust could form part of an underlying latent attitudinal variable rather than a true predictor of perceived consequences or acceptance.

Figure 2.2 Two competing models of trust

(a) causal-chain model of trust



(b) associationist model of trust

A recent study by Bronfman et al. (2012), examining the acceptance of hydro in Chile (among other technologies), through the use of Structural Equation Modelling (SEM), concluded that their data fitted well with a model of trust based on a causal-chain. However, although the associationist view was commented upon, it was not made clear whether such a model would have provided a better or worse fit for the data. A similar trend is observed across other similar studies using SEM for validation of causal-chain models, where models representing an associationist view of trust are not assessed (e.g. Poortinga & Pidgeon, 2006; Stampfli, Siegrist, & Kastenholz, 2010).

2.3.3 Social influence of groups

The social context described in Chapter 1 suggested that there is a large role played by ethnic and political groups in people's formation of views toward hydro. Considering the historic discrimination and brutal exclusion that certain groups in Chile have experienced, while others have experimented stability of their economic power and political influence (see Chapter 1), it is natural to identify higher-order groups which summarise the sociological context of intergroup conflict associated with electricity generation. In this sense, two higher-order groups could be identified: the majority and the minorities; which in line with social dominance theory (Sidanius, Pratto, Laar, & Levin, 2009; Sidanius & Pratto, 1999) respectively match with those of a dominant group, consisting of political and economic elites, mostly of European ancestry; and the subordinate group, composed of common citizens, non-traditional politicians, ethnic minorities. For the moment, following Chapter 1, it will be assumed that the dominant group has prototypical pro-hydro norms; and the subordinate group has prototypical anti-hydro norms (although this assumption is questioned later in this Chapter).

While the borders of such segmentation might be fuzzy, using this type of classification provides a parsimonious approach to Chilean group identities (*group-ids*) framed through a long and complex history, while still accounting for much of the remaining divisions in the current Chilean political arena (cf. Arrate, 2004; Enríquez-Ominami, 2011; Palacios, 2009; Pineda, 2012; Posner, 2008; Rowlands & Aylwin, 2012; Waldman, 2009).

To further examine these ideas, an approach to the study of attitudes based on group memberships can be considered, as it has been proposed by Cooper, Kelly, and Weaver (2001) and by Smith and Hogg (2008). These authors have criticised the previous studies of attitudes because of their individualistic approach, with little attention been given to the social influence of groups (also discussed in Prislin & Wood, 2005). To overcome this, they highlight that studies on intergroup phenomena under the social identity theory approach have provided many insights to understand processes through which groups can influence on people's opinions.

The social identity theory approach refers to the broad perspective offered by the interlinked theories proposed by Tajfel and Turner regarding intergroup relations (Tajfel, 1982) and social categorizations (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). In this approach, the concept of social identity is defined as a part of people's selves developed in relationship to a membership of a social group, which is shared with the other members of it; as opposed to personal identity which refers to individual-specific features on which people might describe themselves or others. It proposes that all people possess both types of identities, but that they might vary in salience depending on the social situations or activities that the individual carries out.

Among the key notions in these theories is the proposal that in situations where *group-id*s become salient, as a consequence, people tend to accentuate their perception of similarities and minimize the differences with members of their group, while accentuating differences with members of perceived out-groups (Tajfel, 1982)

This basic principle of accentuating in-group similarities has been described as the basis for enabling *referent informational influence* through the assimilation of systems of values and preferences from the group to individuals (Turner et al., 1987), and through enhancements in the perception of fellow in-group members (Brewer, 1979, 1999, 2008). In this sense, it has been observed that people are more likely to accept information for attitudinal change from members of their in-groups (Cooper et al., 2001).

Hogg & Abrams (1998) described a process in which people assign themselves to a social category, they learn the stereotypic norms of the category, and then they assign to themselves the same norm. Therefore when that identity becomes salient, their behaviour and views conform to the norms of the group. In any case, both assimilation and conformity to the norms of a group are more expected when the membership to it is a significant and valued part of the individual's self-concept, i.e. devotion to the stereotypic norms would be expected from individuals with high-levels of *group-id* (Cooper et al., 2001).

In this sense, those identified with the dominant group (high dominant *group-id*) should have more positive attitudes towards hydro development, since they would perceive that they share an in-group with developers and supporters, and therefore, they would share their norms. Contrariwise, people who do not identify themselves with the dominant group (low dominant *group-id*) should exhibit less positive attitudes towards hydro, since they would not necessarily share the norms of the proponents of these projects.

Additionally, individuals identified with subordinate groups (high subordinate *group-id*) would be expected to hold more negative attitudes towards hydro, because of sharing norms with those who typically oppose hydro; and those not identified with the subordinate group (low subordinate *group-id*) would show less negative attitudes towards hydro because of not necessarily sharing such norms of opposition to hydro.

A similar view is shared by Mairal (1998, 2004, 2008) who, in the context of local opposition to hydro projects in Spain, theorised that the fact that opponents to hydro identified themselves as part of a *minority* was central in amplifying the controversies. In his work, he extends these concepts to explain the international support for the Pehuenche in the case of the Pangue and Ralco Dams. His notion is that since anyone can be a *minority* at some point, perceiving the Pehuenche as a *minority* is what allows a sense of empathy in those who are not necessarily directly negatively affected by hydro developments (Mairal, 2004). In this sense, he proposes that a perceived *social shared identity* is what could have motivated others to be united to the plight of the Pehuenche.

A common form of inter-group bias is that individuals tend to perceive in-group members as comparatively more trustworthy, honest and loyal (Brewer, 1979, 2008; Tanis & Postmes, 2005). This enhancement of trust for in-groups has been linked to positive regard, cooperation and empathy (Hewstone, Rubin, & Willis, 2002). Under a common social identity, higher cooperation has been explained as the result of perceiving that other in-group members share the same-goals (Cremer & Vugt, 1999), intentions and values (Earle, 2010b). Contrarily so, salient intergroup boundaries are associated with distrust in members of out-groups (Brewer & Kramer, 1985; Hewstone et al., 2002).

Considering that trust in stakeholders is proposed as a key variable in defining people's views towards technologies, if group biases play a role in this sense, it should be expected that those with high dominant *group-id* would exhibit more positive attitudes towards hydro, because of enhanced levels of trust, as the result of an in-group bias. On the other hand, those with low dominant *group-id*, would be expected to have less positive attitudes, because of not having enhanced levels of trust (absence of in-group bias).

Moreover, those with high subordinate *group-id*, would have more negative attitudes to hydro, because of experiencing a detriment on trust in stakeholders as a result from an out-group bias effect; while those with low subordinate *group-id* should have less negative attitudes, because of the lack of this out-group bias effect.

2.4 Discussion

The previous review has identified key constructs that might play a role in defining people's acceptance of hydro; in relation to these, a number of questions arise leading to four lines of enquiry (summarised in Table 2.1): (i) further clarification of prototypical groups norms in the Chilean context, (ii) assessment of relationships between the variables of interest to the current thesis (*acceptance*, *consequences*, *trust*, *group-id*); (iii) further examination of the specific relationship between *trust* and *group-id*, and (iv) establishing comprehensive theoretical models to account for the relationships between these variables.

Table 2.1 Research plan

Questions	Aims	Methods
Are prototipical norms regarding hydro actually different between groups?	Further clarification of group norms	Thematic analysis of national newspapers articles (Chapter 3)
How related are the proposed variables (*consequences, trust*, *group-id*) to the *acceptance* of hydro?	Assesment of relationships between variables	Correlational analyses: bivariate correlations and multiple linear regressions (Chapter 4)
What is the nature of the relationships between *trust* and *group-id*?	Further examination of the specific relationship between *trust* and *group-id*	Experimental approach (Chapter 5)
How can the relationships be explained in an integrative account?	Establishing comprehensive theoretical models	Assesment of competing structural models (Chapter 6)

2.4.1 Further clarification of group norms

In Chapter 1 it was established that there were controversies related to hydro, which were likely to be linked to social influences and concern beyond *just caring for the local environment* (i.e. intergroup conflict, inequity, socio-political history, and ethnicity). In this sense, it is possible to form associations between the Chilean groups described in Chapter 1 (i.e. the Mapuche/Pehuenche people and other repressed and neglected groups) and the issue of hydro development.

Although notions like these have been speculated by Chilean scholars (Rowlands & Aylwin, 2012), and they might be perceived as evident for those wishing to see the links (e.g. psychologists interested in the study of intergroup conflict), it is actually not clear, in terms of evidence-based studies of the public opinion, whether these relationships are actually present in Chilean public discourse. For these reasons, a much needed consideration for research in this context would be to clarify whether there are strong reasons to suppose that there are norms that would differ across groups in the hydro context.

Hogg & Reid (2006) have proposed that one way that groups use for the diffusion of their prototypical norms groups is through the use of mass media (a notion also supported by the social amplification of risk framework, see Pidgeon, Kasperson, & Slovic, 2003). In this sense, an analysis of relevant Chilean media is a sound step to examine whether Chilean groups would be expected to vary across prototypical norms regarding hydro.

2.4.2 Relationships between the discussed variables

Theoretical arguments were identified to propose that *consequences*, *trust,* and *group-id* (if different prototypical norms are found) variables would be expected to be related to the acceptance of hydro. However it cannot be immediately assumed that this would be the case in the Chilean context, especially considering that contextual societal variables have been also proposed to play an important role in defining people's attitudes.

Since no studies had been conducted to look at the relationships between these 3 variables at the time that this thesis was started, testing for the presence of these relationships in a Chilean sample became a principle aim of the current research.

2.4.3 Specific relationship between trust and group-id

If the relationships between the variables of interest were found to exist in the context of this research, it was considered that each of these relationships would require an explanation. In particular, it was estimated that it could be of great contribution, to focus especially on relationships less typically analysed in the applied context of electricity generation technologies, to enable the development of theory in ways that appear to be less obvious for researchers in this area. In this respect, while there is very little cross-referencing between literatures concerning the acceptance of technologies and the social influence of groups, the literature review suggests that the role of *trust* could explain much of how these two literatures can relate to each other.

Moreover, if the relationships between *group-id*, and trust, are an adequate explanation for the relationships between *group-id* and acceptance, it could be expected that such results would be found in an experimental approach; as such this became the focus of Chapter 5.

2.4.4 Establishing comprehensive theoretical models

It was noticed that there were alternative competing theories for explaining the role of the same constructs (e.g. causal-chain model of trust vs. associationist model of trust). So from the literature, it remained unclear what explanation provided a better explanation for how attitudes are formed.

Therefore, it was necessary to build comprehensive models that could meaningfully account for all the relationships observed between the variables of interest, and moreover, to test what models should be preferred. In this respect, the use of structural equation modelling (SEM) was adopted, as it is a recommended method (Kline, 2011) to tackle this type of need (see Chapter 6 for further details).

2.5 Conclusions

Previous research and theories into the public acceptance of technologies, suggest that at least three types of variables need to be explored as potential explanations for why people would hold positive or negative views about hydro: perceived consequences, trust in stakeholders, and social identities held in relation to groups salient to the context (in short: *consequences*, *trust*, and *group-ids*).

A number of research questions and a plan of empirical studies were outlined to cover four lines of enquiry: exploration of prototypical group norms in the Chilean context, assessment of relationships between the variables of interest (i.e. *acceptance, consequences, trust*, and *group-ids*), further examination of the potential relationship between *trust* and *group-ids*, and evaluation of comprehensive theoretical models. The first of these lines of enquiry is explored in the following chapter through a thematic analysis of Chilean newsprint articles.

3 A thematic analysis of newsprint articles about energy generation

3.1 Summary

The Chilean context of electricity generation is further explored through a thematic analysis of Chilean newspapers to identify how electricity generation issues are depicted, and whether prototypical norms are observed in relation to subordinate and dominant groups.

The main findings revealed that newspapers differed in terms of the evaluations they portrayed of electricity generation technologies, including hydro, and in terms of the types of stakeholders they focused on. In accordance with what was expected, the 'dominant-source' focused more on dominant stakeholders and a positive framing of technologies, and the 'subordinate-source' focused more on subordinate stakeholders and a negative framing of technologies.

3.2 Introduction

As suggested by social identity theorists (Hogg & Reid, 2006), and in line with the social amplification of risk framework (cf. Kasperson et al., 1988), reports in the media, beyond just informing individuals, provide the dual functions of: (a) expressing the voice of groups about certain topics; and (b) educating people about the norms that are expected to be held by members of those groups regarding issues in which they are not experts. In this sense, a thematic analysis of newsprint media was proposed to identify differences in how groups frame electricity generation issues, and to what aspects they give more prominence to.

3.3 Methods

A content analysis was performed on newsprint articles concerning issues of electricity generation within newspapers with different ideologies to see how they framed these topics. In this sense, the analysis focused on five themes for which articles were coded. These themes were: source, technology, evaluation,

evaluator, and issue. Each of these criteria relates to a theme that is of importance in understanding how group identities, trust and attitudes might influence the acceptance of power generating infrastructure, as clarified in Table 3.1.

Table 3.1 Coding themes for the analysis of newspaper articles

Theme	Underlying question	Rationale
Newspaper	Where was the article found?	Diverse sources can provide a look into what groups might think, or to what they might try to pass to members of the group
Technology	What technology does the article refer to?	Looking at hydro and other technologies allows for comparison and a consideration of the wider-context beyond just-hydro
Valence	How are technologies evaluated through the article?	Provides a look at the acceptance and attitudes held towards hydro and other technologies
Stakeholder	Who are portrayed as evaluators of technologies through the article?	Provides a look at what could be the norms for attitudes of diverse groups according to the media coverage
Consequence	Why is it the technology evaluated through the article?	Provides a look into beliefs of consequences that might be held in relation to hydro and other technologies

Taking into consideration the guidelines presented by Bryman (2008) for thematic analyses and the context of this research outlined in previous chapters, a process for data collection and analysis was designed to perform the media content analysis in order to explore articles across the five above mentioned themes.

The first step was identifying relevant sources for diverse Chilean groups. In this respect, it was found that much research into Chilean media (Bresnahan, 2003; Leon-Dermota, 2003; Sorensen, 2009; Tanner, 2001) pointed towards *El Mercurio* newspaper as the most authoritative and representative newspaper for the dominant groups and right-wing politics. This newspaper not only backed up the *coup d' etat* and the following dictatorship during the 70's and

80's, but, in fact, the early CIA infiltration into Chile was partly orchestrated by its owner (Agustín Edwards)[9].

A pointer of the normative influence that it has is revealed in the words of Jaime Guzmán, far right-wing ideologist, and advisor to Pinochet during the military dictatorship:

> *"I completely agree with the editorials of El Mercurio on every issue on which I have a well-formed opinion. And on those issues in which I do not have an opinion of my own, I adopt that of El Mercurio"*[10].

El Mercurio is the main newspaper of its publishing company (of the same name), which owns most of the Chilean regional newspapers. This company is so central to Chilean politics, that it has few real competitors in the market[11]. It has been proposed that dominant-stakeholders are not too keen on advertising in alternative sources that would not represent their views (Leon-Dermota, 2003), so alternative newspapers have severe funding difficulties.

In the search for alternatives, *La Nación* was identified, which at the time of this research had secure funding, because of being a state-owned newspaper. It has been characterised by centre-left and pro-government tendencies (at least until 2010), and it has been the voice of the governing coalition "the Concertación" for about two decades. La Nación was shut down by the military dictatorship in the 70's but became re-active in the early 90's when democracy was re-established. Lately (after this study was completed), La Nación has been put out of print by the current right-wing government, so it is only available online.

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[9] Some of the links between El Mercurio and the violations of human rights during Pinochet's dictatorship are presented in the documentary film *Agustin's Newspaper* (in Spanish: *El diario de Agustín*) by director Ignacio Agüero (2008).

[10] Words by Jaime Guzmán in 1980 (in Leon-Dermota, 2003, p29)

[11] The only competitor in the market is La Tercera newspaper, owned by COPESA S.A., which has been described as typically favouring the dominant groups, and expressing nearly identical political views as *El Mercurio* and its sister newspapers. They form together what has been characterised as a duopoly (Leon-Dermota, 2003).

Finally, *El Ciudadano* was also chosen, which is a more recently founded online newspaper. It is characterised by leftist and pro-minority tendencies. It is part of a network of media sources whose explicit goal is to "overcome the media blockage" imposed by other sources, depicting themselves as the anti-establishment voice of the unheard. Founded in the south of Chile, El Ciudadano has been active for about a decade[12].

Additionally, it was necessary to define a contextually meaningful time-period for the search, i.e. a time period that represented the status of debate at the time that this thesis' research plan was being formulated, and therefore, it was decided to look for articles published in the month of September of 2009.

In performing a web search of articles, a list of keywords were used to cover all the electricity generation technologies that have, to date, been considered for the Chilean context. The original Spanish terms used for the research, and their English translation, are shown in Table 3.2.

Table 3.2 Web search keywords

Target	Original (Spanish)	Translated (English)
Nuclear	nuclear, atómica	nuclear, atomic
Fossil	fósiles, carbón, diésel, petróleo, gas, termoeléctrica(s)	fossil, coal, diesel, petroleum, gas, thermoelectric
Hydro	hidro, hidroelectricidad, hidroeléctrica(s), represa(s)	hydro, hydroelectricity, hydroelectric, dam(s)
Renewables	renovables, eólica, solar, geotérmica, mareomotriz, biodiesel, biogás, biomasa, biocombustibles,	renewables, wind, solar, geothermal, tidal, biodiesel, biogas, biomass, biofuel(s)

Having identified a list of URLs, the articles were accessed, examined, and coded for contents relating to the five broad themes under study. Twenty-three articles were dismissed because of being unrelated to energy generation issues

[12] N.B. Other national newspapers (e.g. La Tercera, Las Últimas Noticias, La Cuarta, La Segunda, El Mostrador, El Clarín) were dismissed because at the time of the research they did not have enabled search queries in their respective websites.

(the full list of URLs, including those articles which were not used can be found in appendix A). Subsequently, the codes assigned to the articles were reorganised into a more manageable and comprehensible set of higher-order codes for each of the themes under study.

In order to assess the reliability of the coding, a sub-set of articles (*n*=15, representing ~17% of the final set of articles) were independently coded by two Spanish-speaking postgraduate psychologists using the coding manual. The coding was then compared and issues with the coding manual discussed. Having found that the coding was identical, and that neither coder took issue with the manual, it was suggested that the coding reflected the content of the articles and that the coding was reliable, and so the frequency of codes were analysed through contingency tables and chi-squared tests.

3.4 Results

The results of this study are presented in three sections. The first section describes the concise set of codes used for each theme and the frequency of each in the total sample of articles. The second section examines the relationships between themes; and in the third section, differences within themes are examined for articles that had either pro- or anti-hydro evaluations.

3.4.1 Frequency of codes

A total of 87 articles were identified and analysed and coded across the five themes of the study. It is worth noting that there seems to be a relatively large number of articles on energy generation issues being published across these newspapers (~3 articles per day), probably reflecting upon the relevance of the issue for the national context. Table 3.3 reveals frequencies for each of the codes, which are defined in detail in the following sections.

Table 3.3 Coding frequencies by theme

Theme / Code	n	%
newspaper		
subordinate-source	20	23%
in-between-source	20	23%
dominant-source	47	54%
technology		
nuclear	28	32.2%
fossil	34	39.1%
hydro	38	43.7%
renewables	26	29.9%
valence		
anti	44	50.6%
pro	55	63.2%
stakeholder		
dominant-member	57	65.5%
subordinate-member	38	43.7%
editorial	28	32.2%
consequence		
environmental	38	43.7%
economic	54	62.1%
societal	42	48.3%

Newspaper

This theme indicates in which of the three newspapers under analysis the article was found. The codes are *subordinate-source*, *in-between-source*, and *dominant-source*, respectively referring to El Ciudadano, La Nación, and El Mercurio. This is a mutually-exclusive coding theme since none of the articles were duplicated across sources, and therefore each article is coded only once.

Frequency results in Table 3.3 reveal that the dominant-source showed the larger number of articles related to electricity generation, exceeding the other sources in more than twice. This could be partly explained because this newspaper is more prolific in general (it publishes a larger number of articles in all subjects); but it could also represent a tendency for this source's editorial board (or readership) to be more concerned with issues of electricity generation.

Technology

This theme reports what electricity generation *technologies* were mentioned in each article. This is regardless of whether such technologies are the main issue under report. The self-explanatory codes for this theme are *nuclear*, *fossil*, *hydro* and *renewables*. Since many articles referred to more than one type of technology (*n*=31), these are non-mutually exclusive codes.

Frequencies in Table 3.3 show that overall, hydro was the electricity generation technology most commonly referred to in newspapers, followed by fossil, nuclear and finally, renewables (which of these are more positively or negatively evaluated is analysed further on in this chapter).

Valence

This coding theme refers to whether the electricity generation technologies mentioned in the article are evaluated positively or negatively. The self-explanatory codes in this theme are *anti* and *pro*. The code is not meant only to reflect the evaluative tone used by the reporter, but also to identify whether the views of individuals and/or groups which are being mentioned within the article are supportive or objectionable.

Since many articles had more than one type of evaluation about the same electricity generation source, or had a positive evaluation for one technology, and a negative evaluation for another, or both situations together, these are non-mutually exclusive codes and a number of articles were assigned both codes (*n*=12).

The results in Table 3.3 show that there were more articles with positive evaluations than with negative evaluations (the distribution of these across newspapers is examined later on in this chapter).

Stakeholder

This theme refers to who are those portrayed in the article. The codes in this theme are broad, covering many sub-groups. The first is *dominant*, which refers to the establishment, and can refer to the government, the parliament, private companies, or its representatives; the second is *subordinate*, and refers to outsiders to the establishment, which can include religious, academic,

artistic, ethnic, environmentalist and local residents' groups, or their representatives; finally, the code *editorial* refers to when the writer of the article explicitly displays an evaluative comment regarding some of the electricity generation technologies.

Considering that many articles (*n*=33) included more than one type of stakeholder, this is a non-mutually exclusive coding theme (articles can be coded more than once). Frequencies in Table 3.3 show that the *dominant* stakeholders had more coverage than the *subordinate* ones, and that the *editorial* had the smaller frequency.

Consequence

The last theme indicates the reasons why an electricity generation source is portrayed as positive or negative. Codes for this theme were adopted to reflect criteria for which technologies are typically evaluated, and these are *environmental*, *economic* and *societal*, i.e. the three pillars of sustainability (Elkington, 1997).

The *environmental* code was used for articles which referred to aspects such as climate change, biodiversity, and other local environmental consequences. The *economic* code included references to effects over issues such as economic growth, local development, jobs, and tourism. Finally, the *societal* code included issues of safety, health, wellbeing, rights and political repercussions.

Since a number of articles (*n*=33) mentioned consequences that were explicitly spread across more than one issue this is also a non-mutually exclusive coding theme. Frequencies in Table 3.3 reveal that the most commented aspects were *economic*, followed by *societal*, and finally *environmental*.

3.4.2 Relationships between themes

A number of chi-squared tests were performed to assess whether the coding themes were related to each other. These tests assess, for example, whether certain newspapers focused more on certain consequences than others, or whether hydro is more frequently associated to certain stakeholders

in comparison to other technologies. The analyses were first performed on a general level using all the articles, and secondly using only articles which referred to hydro.

Analyses using the whole set of articles

The results of chi-squared tests using the whole set of articles are found in Tables 3.4, and they reveal a number of relationships between themes (further analyses are supported by Bonferroni's post-hoc tests at $p<.05$).

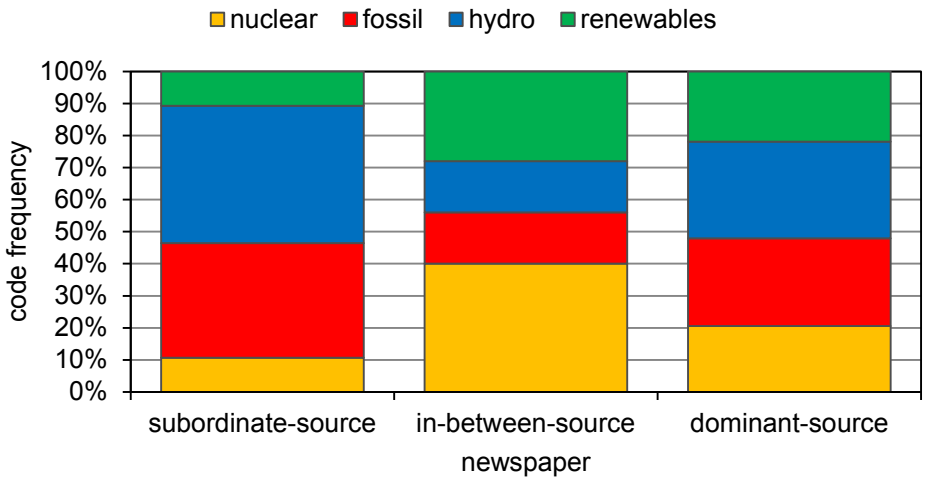
Table 3.4 Chi-squared tests for relationships between coding themes

terms	*df*	χ^2	*p*
newspaper x technology	6	12.663	.049*
newspaper x valence	2	22.136	<.001*
newspaper x stakeholder	4	10.571	.032*
newspaper x consequence	6	3.188	.785
technology x valence	3	18.443	<.001*
technology x stakeholder	6	5.558	.475
technology x consequence	9	12.353	.194
valence x stakeholder	2	5.207	.074
valence x consequence	3	1.740	.628
stakeholder x consequence	6	3.900	.689

Note: * significant at $p<.05$

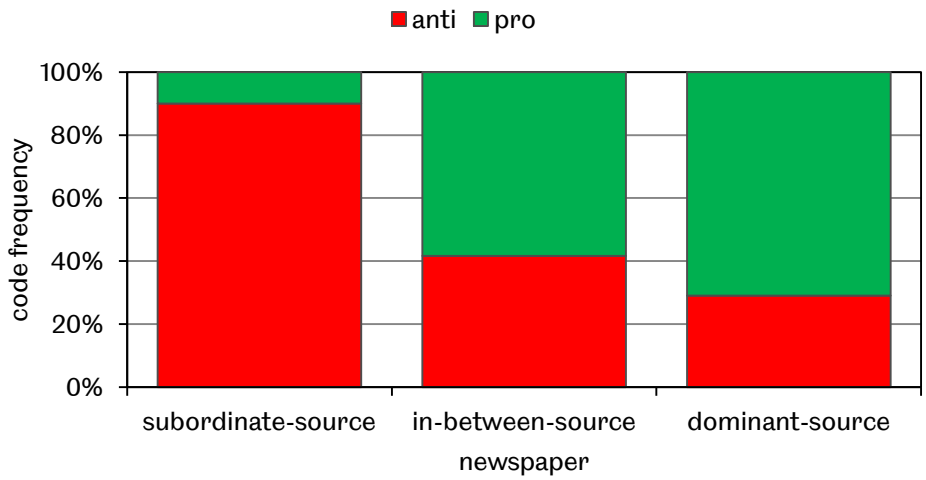
It was observed that newspapers varied with respect to the technologies that they discussed (newspaper x technology), with the in-between-source focusing proportionally more on nuclear power when compared to the subordinate-source publications, as shown Figure 3.1. On the other hand, the remaining proportions were found to be not significantly different.

Figure 3.1 Proportional frequencies of technology by newspaper



Moreover, it was found that there were significant differences regarding the valence of articles that were more common across newspapers (newspaper x valence). As illustrated in Figure 3.2, the subordinate-source showed proportionally more articles with expressions against electricity generation technologies; and the dominant source was disproportionally likely to represent pro views.

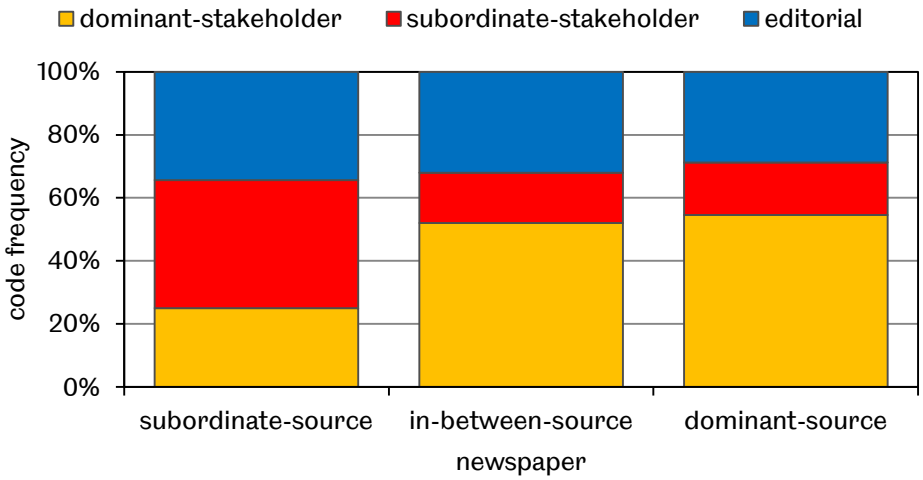
Figure 3.2 Proportional frequencies of valence by newspaper



Similarly, it was observed that there were differences across the stakeholders mentioned in newspapers (newspaper x stakeholder). As depicted

in Figure 3.3, the subordinate-source covered proportionally more about the views of subordinates than did both of the other newspapers.

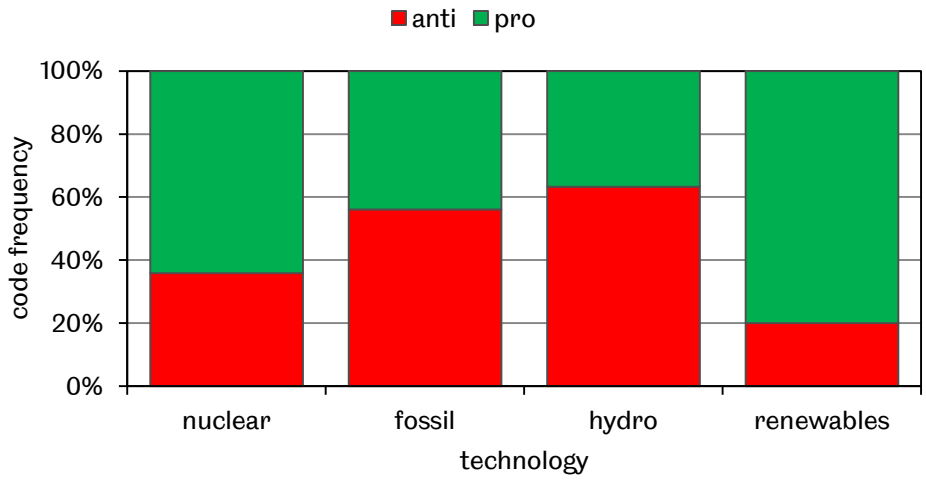
Figure 3.3 Proportional frequencies of stakeholder by newspaper



There were no significant differences bewteen the type of issues that were covered in different sources (newspaper x consequence), i.e. different sources covered diverse consequences of electricity generation technologies in equivalent proportions.

The relative frequency of articles referring to different technologies did not vary significantly across stakeholders (technology x stakeholder) nor consequences (technology x consequence). However, they were observed to vary across the valence of the articles (technology x valence). In this sense, as shown in Figure 3.4, there were more articles with negative evaluations for hydro than for nuclear and renewables; and there were more articles with positive evaluations for renewables than for fossil-fuels and hydro.

Figure 3.4. Proportional frequencies of valence by technology



The remaining tests showed that there were no significant relationships in articles regarding valence x stakeholder, valence x consequences, and stakeholder x consequences.

Analyses of articles regarding hydro

Within the sub-sample of articles that covered hydro (*n*=38), it was found that that there were significant differences in the valence of the articles regarding hydro across newspapers, stakeholders and consequences (see Table 3.5).

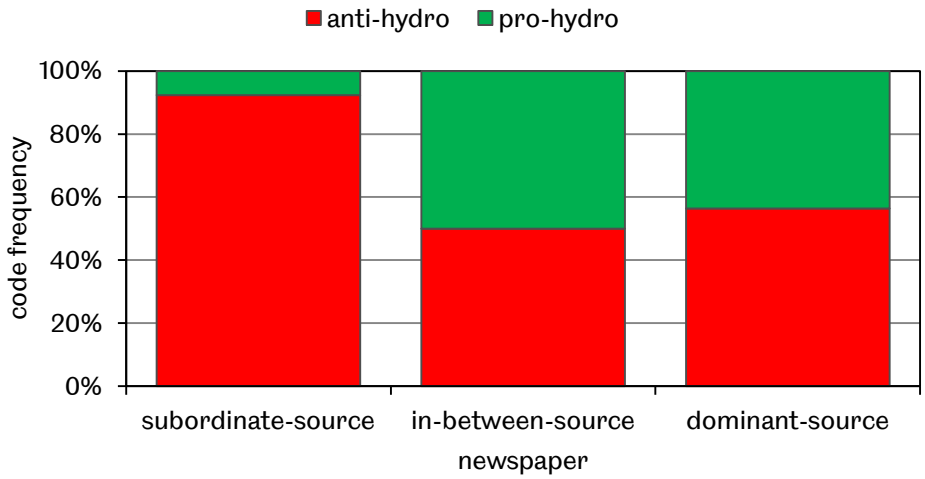
Table 3.5 Chi-squared tests for themes by valence for hydro

Terms	*df*	χ^2	*p*
newspaper x valence-hydro	2	6.117	.047*
stakeholder x valence-hydro	2	11.928	.003*
consequence x valence-hydro	3	12.912	.005*

Note: * significant at $p<.05$

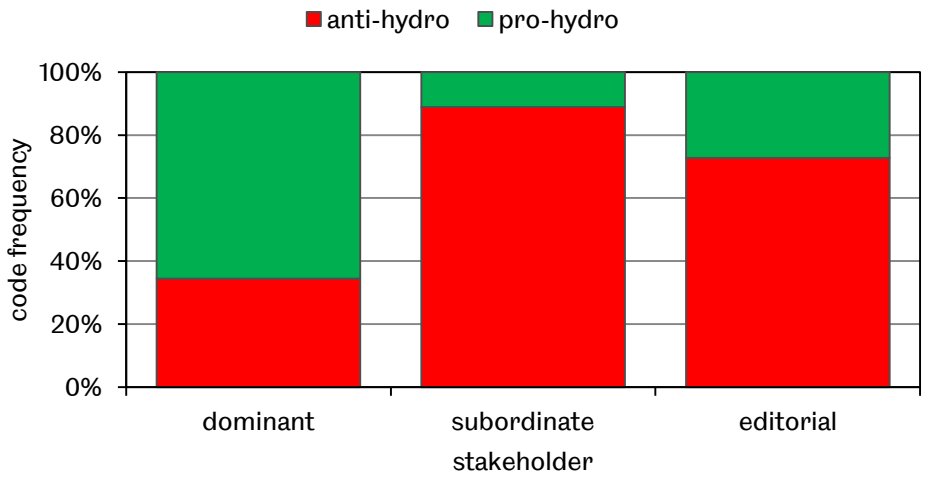
When investigating differences in newspapers, post-hoc tests revealed that the subordinate-source showed proportionally more anti-hydro articles and proportionally less pro-hydro articles than the other sources (see Figure 3.5).

Figure 3.5 Proportional frequencies of valence (hydro) by newspaper



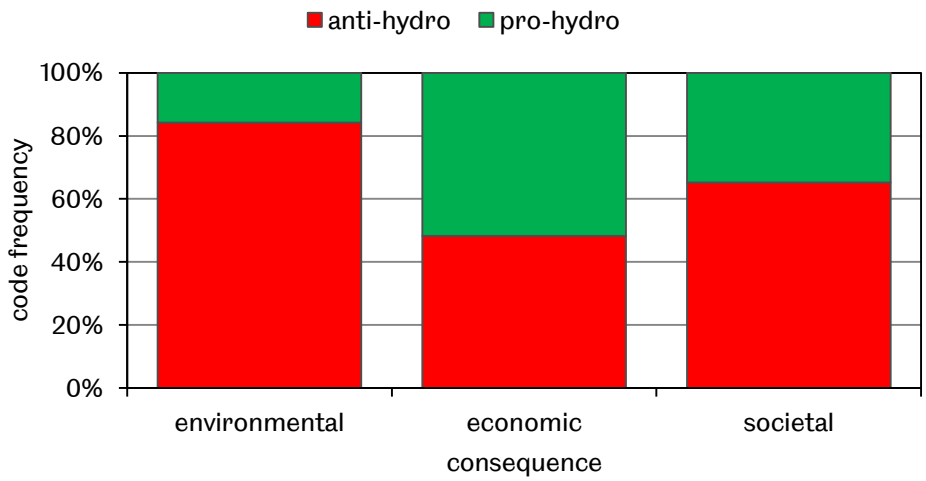
In relation to stakeholders, as shown in Figure 3.6, it was found that subordinates were proportionally linked to more anti and less pro-hydro articles than the other types of evaluators (although the editorial stakeholder also showed more articles with anti-hydro valence). On the other hand, the reverse tendency was observed for dominant stakeholders, who were linked to more pro, and less anti-hydro articles.

Figure 3.6 Proportional frequencies of valence (hydro) by stakeholder



Regarding differences in consequences, as illustrated in Figure 3.7, environmental issues were more associated with anti-hydro evaluations than with economic issues.

Figure 3.7 Proportional frequencies of valence (hydro) by consequence



3.5 Discussion

These sets of findings are in line with the notions exposed at the beginning of this chapter. That is, there were marked differences between how newspapers framed energy issues in terms of their emphasis on different valence and stakeholders.

It was considered that these newspapers are both representing and targeting different groups within Chilean society (Leon-Dermota, 2003), and thus are reporting issues as would better represent the prototypical norms of these groups (cf. Hogg & Reid, 2006; Kasperson et al., 1988). In simple terms,: members of the dominant group (i.e. large companies, the government) and their newspaper (i.e. El Mercurio, and arguably, La Nación) support the development of many technologies (particularly hydro); while subordinates (indigenous groups, residents, dissident politicians) and their media (El Ciudadano) oppose many technologies for development. These tendencies are accentuated when looking only at evaluations of hydro. The subordinate-source is not only more opposed to technologies in general, but this is particularly pronounced in relation to hydro. Therefore, it would be expected

that in a correlational assessment, *dominant group-id* would be related to more pro-hydro views, and subordinate *group-id* would be related to more anti-hydro views.

It is particularly interesting to note that while, overall, more reports tended to positively evaluate electricity generation technologies, the opposite was true in the case of hydro. This suggests that while the other technologies are commented upon in more mixed or positive terms, hydro is strongly associated with negative evaluations in the public discourse. This does not imply that the other technologies are necessarily more supported, but could reveal that the issue of hydro is related to a larger number of well-known negative consequences in the Chilean setting (e.g. relocation of people, flooding of land).

This contrasts with nuclear, for example, which is associated with more positive evaluations, regardless of the fact that Chile is the most opposed country to nuclear in South America; with nuclear power encountering more opposition in public surveys than hydro (Latinobarómetro, 2008). A difference might be found in the fact that nuclear power does not exist in Chile (any development of it is projected not to happen for at least 20 years), and the reasons to oppose it might be less diverse. So, although nuclear is strongly opposed, as it is a technology which its potential implementation is distant in time, it is not as much discussed by the public and the media. This contrasts with hydro, against which massive protests are held regularly, and on which many public figures make comments.

Finally, it must be noted that the only difference found with regard to *consequence* within the analysis was in relation to the evaluation of hydro. Hydro was more readily associated with negative environmental consequences. This perhaps conflicts with hydro's status as a low-carbon technology. However, it might reflect the fact that the only perceived environmental benefit of using large-scale hydro is its comparatively low emission of carbon compared to fossil fuels, and people might be considering the local detriments rather than the national or global benefits. So even for supporters of hydro, it is possible that saliently available benefits cannot be outweighed, in numerical terms, by the

long list of potential negative consequences that the use of this technology is reported to imply.

3.6 Conclusions

It was observed that media articles from different media sources differed across themes in a polarised way. In this respect, the dominant-source evaluated electricity generation technologies (including hydro) more favourably. It focused more on the views of members of the political and economic establishment, who also appeared to be more supportive of hydro. In contrast, the subordinate-source covered more negative views about technologies (especially for hydro). It reported proportionally more about the views of groups who are not in political or economic power, such as Mapuche groups, and who also were portrayed to be more opposed to hydro. It was considered that these findings strongly suggest the existence of the previously outlined prototypical group norms.

4 A correlational assessment of predictors of acceptance of hydro

4.1 Summary

This chapter seeks to characterise attitudes towards hydro in a Chilean sample. It also aims to elucidate whether the variables proposed in previous chapters (i.e. *consequences, trust,* and *group-id*) predicts the *acceptance* of hydro when assessed through correlational analysis.

To collect pertinent data, a questionnaire was developed comprising measures of acceptance, consequences, trust and group-id. The results examine descriptive statistics, and the relationships between *these variables* in bivariate correlations and multiple linear regressions.

4.2 Introduction

Throughout previous chapters it has been suggested that the acceptance and opposition to hydro in Chile could be explained as an outcome of: (1) the perceived consequences of the use of hydro; (2) as a by-product of the trust or distrust that people might hold towards relevant stakeholders; and (3) as a result of people's identification with dominant and subordinate groups.

Following the methodological approach of preceding research (e.g. Ansolabehere & Konisky, 2009; Bronfman et al., 2008; McDaniels et al., 1997; Thomas et al., 1980), it was considered adequate and necessary to use a correlational approach to test whether or not associations existed between measures of *acceptance, consequences, trust, and group-ids.*

Since no reports of surveys carried out in Chile to specifically investigate opinions regarding electricity generation were found to exist at the time of conducting the research, it was deemed necessary to conduct one. This process implied the development of a questionnaire that covered the discussed variables for its use on a Chilean sample.

The analyses of the collected data comprised: (1) assessing descriptive statistics; (2) carrying out factor analyses and evaluating the reliabilities of

composite measures (to simplify a large number of items to a more manageable number of dimensions); and (3) testing for the existence of significant relationships between the proposed predictors and the criterion variable through bivariate correlations and multiple linear regressions.

4.2.1 Hypotheses

A number of hypotheses presented in Table 4.1, were developed to test the directional relationships expected from the perspectives outlined in the literature review.

Table 4.1 Hypotheses of the correlational study

Hypothesis I: acceptance will be positively correlated with (positive) consequences
Hypothesis II: acceptance and consequences will be positively correlated with trust
Hypothesis III: acceptance, consequences and trust will be positively correlated with dominant *group-id*s
Hypothesis IV: acceptance, consequences and trust will be negatively correlated with subordinate *group-id*s

In line with previous research (cf. Ansolabehere & Konisky, 2009; McDaniels et al., 1997; Sjöberg, 1999, 2000; Thomas et al., 1980), it was expected that the *acceptance* (of hydro) would be positively correlated with the perception of positive *consequences* of its use (hypothesis I).That is, people who perceive hydro to imply good outcomes would be expected to support it, and those who perceive it to carry negative outcomes, would be expected to oppose it.

Similarly, it was anticipated that *acceptance* would be positively correlated with *trust* in relevant stakeholders (Earle, 2010a, 2010c; Siegrist, 2000; Slovic, 1993). That is, people with higher trust in regulators (here, the government, companies, and experts) would be expected to have higher levels of *acceptance (*whereas those less who trust these stakeholders less, would have lower *acceptance*), and would perceive more positive *consequences* (hypothesis II).

Finally, considering the perspectives on social influence offered by social identity approaches (Cooper et al., 2001; J. R. Smith & Hogg, 2008; Tajfel, 1982; Turner et al., 1987), and considering the Chilean context of groups and their prototypical norms (see Chapters 1 and 3) it was predicted that individuals identified with dominant groups (*dominant group-id*) would display higher *acceptance,* perception of more positive *consequences,* and higher *trust* (hypothesis III)*;* whereas those identifying with subordinate groups (*subordinate group-id*) would express less *acceptance,* and perception of more negative *consequences,* and lower *trust* (hypothesis IV)*.*

4.3 Methods

4.3.1 Questionnaire

A questionnaire was developed in paper and online formats. The instrument was preceded by a cover letter explaining the purposes of the study, ensuring the confidentiality and discretion with which the data would be treated, and emphasising the academic motivations of the research team and its independence from any kind of compromise with political, stakeholders, or other lobbying groups.

The survey was designed by adapting items used in previous studies (see sections below for further details). The items adapted from studies in English were translated into Spanish by the main researcher, and subsequently, with the collaboration of a professional translator and a postgraduate-level social psychologist, were back-translated into English to ensure that the items kept their original meaning. On the other hand, the items adapted from studies in Spanish, were translated into English by the main researcher with the help of the same professionals, to ensure the accuracy of the English translation. The contents of the questionnaire measured *acceptance*, *consequences*, *trust*,

group-ids, and *demographics,* as described in more detail in the following subsections[13] (the contents in English and Spanish can be found in appendix B.)

Acceptance

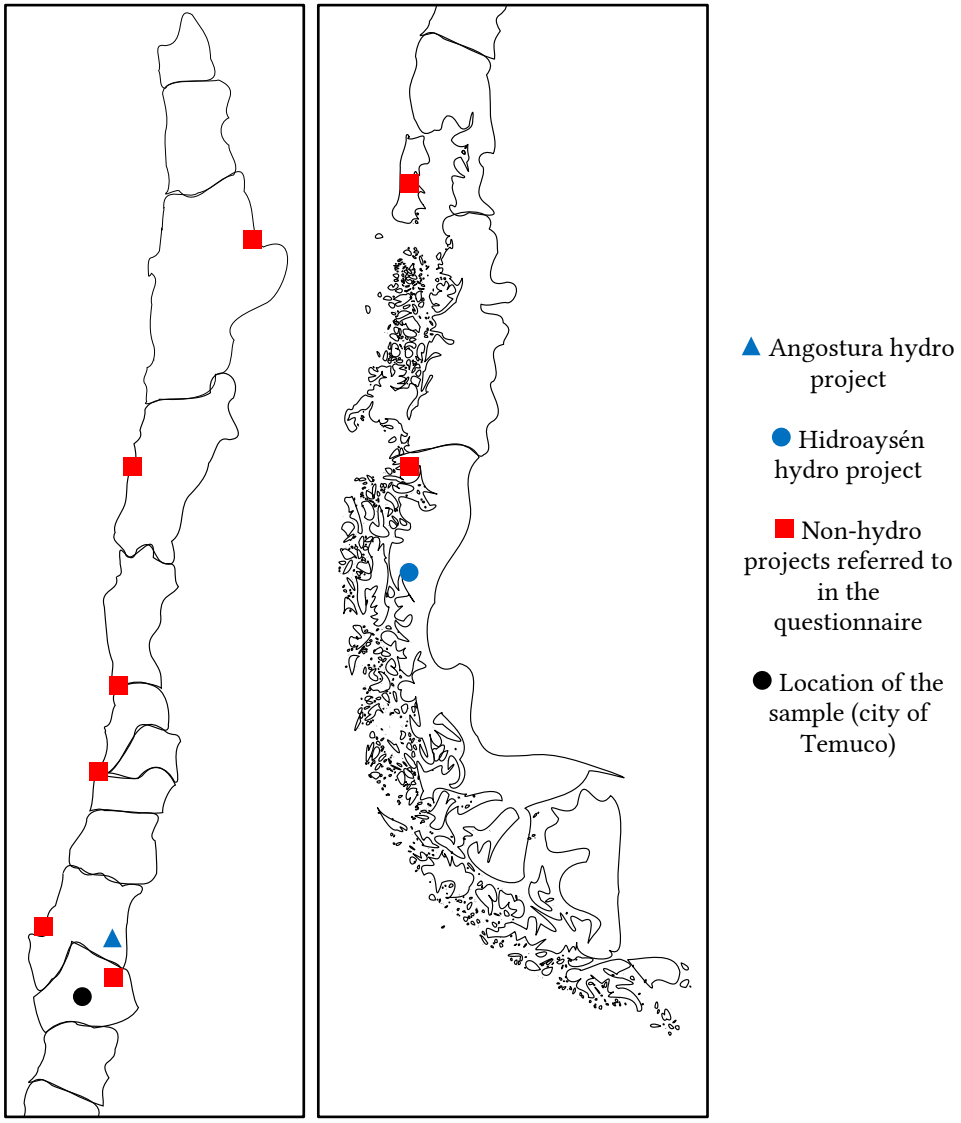
To record people's *acceptance* of hydro, four items were used (a1 to a4). Participants were asked how they felt about: (1) the expansion of hydro in Chile in general, (2) two specific proposed projects (i.e. *Angostura* and *HidroAysén* projects*,* see Figure 4.1), and (3) a hypothetical development that would take place near (i.e. less than 100 Km) to where they live.

[13] The questionnaire also included other items for their use in parallel studies. These items are omitted here to simplify the report, but are reported in the full versions of the questionnaire found in appendix B.

Figure 4.1 Relevant locations for the survey

Approximate locations for existing and proposed power plants in Chile referred to in the questionnaire.

Designed by the author adapting maps from the public domain.



All of these items had a 5-point scale ranging from “very opposed” to “very in favour” and were adapted from previous studies assessing attitudes towards various electricity generation sources (e.g. Jones & Eiser, 2009; Jones, Eiser, & Gamble, 2011).

Additionally, for all the *acceptance* items, the questionnaire included equivalent items regarding people’s opinions about other electricity generation

technologies. This was done to allow respondents to take into account the broader context of electricity generation alternatives, and to avoid biasing responses because of not providing consideration of other technologies (van der Pligt, Eiser, & Spears, 1987). For these purposes, it was ensured that the items concerning hydro were embedded in a wider set of choices, enabling participants to make comparisons between technologies[14]. The locations of the specific projects addressed within the questionnaire are shown in Figure 4.1.

Consequences

Through eight items (c1 to c8), participants were asked to rate, for a range of criteria, how positive or negative they considered that the *consequences* of using hydro in Chile would be. The items were designed to reflect a wide number of potential consequences identified within the literature and in newspapers (see Chapters 1 and 3). Each item used a 5-point scale ranging from "very negative" to "very positive".

Two items focused on environmental aspects: one at the global-scale (i.e. *consequences* to the global environment), and the other at the local-level (i.e. the specific location where projects would be built); two items focused on economic issues: one at the national-scale and the other at the local-level; and four items focused on societal aspects: one at the national-scale and three at the local-level, concerning "health & safety", "lifestyle", and the "rights" of people living near to projects.

Equivalent items were also recorded for other electricity generating technologies (i.e. nuclear, coal, geothermal and wind) to allow participants to take into account the broader context of electricity generation alternatives.

[14] Four technologies were assessed using a complete equivalent set of items to those of hydro (i.e. nuclear, coal, geothermal, and wind). These were chosen, as they were found to be salient in the media study and because they have more current relevance for the national discussion. Additionally to avoid excessively extending the questionnaire, five other technologies (diesel, natural gas, tidal, and solar) were assessed using only one of the items (i.e. acceptance in general terms).

Trust

To measure people's trust in stakeholders, five items (t1 to t5) were framed in relation to stakeholders found to be salient in the Chilean context. These were: the national government, national and foreign electricity generation companies, and national and foreign engineers.

The items were adapted from previous studies about trust in institutions in Chile (Segovia, Haye, Gonzalez, Manzi, & Carvacho, 2008), and broadly asked how much trust did participants hold towards the stakeholders in relation to electricity generation issues. Items were responded to on a 5-point scale ranging from "not at all" to "very much".

Group-ids

Respondents were asked whether they perceived that they shared an identity in common with five national groups using items (g1 to g5) with a 5-point scale ranging from "very little" to "very much".

One item referred to the majority in broad terms (lit. "the majority of Chileans"); two items focused specifically on groups related to electricity-generation, i.e. proponents of projects (*dominant*) and residents near to projects (*subordinate*); and two items focused specifically on ethnic groups, i.e. *indigenous-Chileans* (*subordinate*) and *European-Chileans* (*dominant*).

Demographics

The following demographic and complementary information was registered by the survey (items d1 to d7): *gender*, *age*, *ethnicity*, *education of parents*, *political orientation*, *perceived knowledge* about energy-related issues, *interest* in energy-related issues, and *belief in anthropogenic climate change*[15]. The coding for these items is shown in the sample characterisation found in Table 4.3.

[15] Nationality was also recorded, but it is not reported here, since all participants were Chileans.

4.3.2 Sample

The questionnaire was responded to by a sample of undergraduate students registered in two universities located in Temuco, in the Araucanía region in the South-Centre of Chile (location depicted in Figure 4.1).

A total of 2998 students from *Universidad Católica de Temuco* (UCT) were invited through their university email addresses to respond the online version of the instrument, of which 146 responded (a response rate of 4.87%). Data provided by UCT revealed that response rates varied significantly by gender, as men responded proportionally more than women $\chi^2(1)=10.802$, $p=.001$. Previous research suggests that this can be understood as a result of men's tendency to be more likely to respond to surveys over the internet (M. A. Smith & Leigh, 1997).

No other significant differences were observed between the students who did not access the questionnaire and those who did in terms of their age, $t(3119)=1.941$, $p=.052$; and year of entry to the university, $t(3070)=1.820$, $p=.069$. Likewise, none of the university's faculties were under-or overrepresented in the group of students who responded $\chi^2(2)=2.718$, $p=.257$. These results suggest that respondents were representative of the student population at UCT.

In the second institution, *Universidad de La Frontera* (UFRO), 93 students were invited by their lecturers to complete the paper-based version of the questionnaire after their attendance at a generic lecture to which students of all academic fields of the university attend. All those invited to respond to the questionnaire agreed to participate.

From these two groups, just those participants who answered over 70% of the items were considered as 'valid cases', and comprised the final sample that was used for the following analyses. No significant differences were found between participants who were excluded for providing incomplete responses to the survey and those that were retained in terms of their age, $t(136)=0.239$, $p=.770$; and year of entry to the university, $t(136)=-0.032$, $p=.975$. In the same way, no significant differences were found in terms of gender representation, $\chi^2(1)=0.045$, $p=.832$, and academic area of undergraduate study $\chi^2(2)=0.067$, $p=.967$. Additionally there were no significant differences between excluded and

retained participants in terms of the values of their responses for all the 20 first items (measuring *acceptance*) found in the questionnaire (all 20 t-tests with $p>.05$). These results suggest that there are no considerable differences between the retained sample and those participants that were excluded from the analysis.

The number of participants in the final sample (n=201) was deemed to be large enough to examine relationships between variables (Van Voorhis & Morgan, 2007), i.e. with a power estimate above 0.99 to identify one-tailed correlations of medium size (~0.3) with an $\alpha=.05$. The sample was characterised by an average age of 19.9 years (SD=2.34) and a proportionally equivalent number of males and females. Further descriptive details are found in Table 4.2.

Table 4.2 Descriptive statistics for demographics

Items	n	%
d1. age (years) M (SD)=19.9 (2.34)		
d2. gender		
(0) female	97	48.26%
(1) male	104	51.74%
d3. ethnicity		
(-2) completely indigenous	7	3.5%
(-1) mixed (more indigenous)	13	6.5%
(0) mixed (equally both)	103	51.2%
(1) mixed (more european)	58	28.9%
(2) completely european	8	4%
other/missing	12	16.8%
d4. education of parents		
(1) primary/basic	13	6.5%
(2) secondary/high-school	91	45.3%
(3) tertiary/higher-education	72	35.8%
(4) quaternary/postgraduate	19	9.5%
other/missing	6	3%
d5. political orientation		
(-2) Left	24	11.9%
(-1) Centre-left	17	8.5%
(0) Centre	10	5%
(1) Centre-right	23	11.4%
(2) Right	13	6.5%
none/ missing	114	56.7%
d6. knowledge about energy issues		
(1) very little	29	14.4%
(2)	51	25.4%
(3)	67	33.3%
(4)	42	20.9%
(5) very much	7	3.5%
missing	5	2.5%
d7. interest in energy issues		
(1) very little	11	5.5%
(2)	17	8.5%
(3)	48	23.9%
(4)	48	23.9%
(5) very much	69	34.3%
missing	8	4%
d7. belief in climate change		
(1) very little	6	3%
(2)	7	3.5%
(3)	30	14.9%
(4)	62	30.8%
(5) outcome of human activity	90	44.8%
missing	6	3%

In terms of *ethnicity*, most of the participants perceived themselves to be of a mixture of indigenous and European ancestry (i.e. the biggest category is the mixed 'both' option). In terms of *political orientation*, a vast majority of the participants did not register a preference (this is examined within multiple linear regressions).

4.4 Results

This section is composed of three sets of results: first the descriptive results of items and scales under study are presented; these are followed by the assessment of bivariate correlations between the variables of interest; and finally, by analyses of multiple linear regressions aimed at identifying whether certain specific sub-aspects of each variable were better predictors as of acceptance.

4.4.1 Descriptive statistics and scales

Descriptive statistics for the items measuring the variables of interest are found in Table 4.3. These will be analysed in the following sections.

Table 4.3 Descriptive statistics for items measuring variables of interest

Variable / Items	*M*	*SD*	*n*
acceptance [a]			
a1. in general	-0.25	1.46	194
a2. specific project 1	-0.94	1.09	200
a3. specific project 2	-0.99	1.17	200
a4. project nearby	-1.11	1.13	201
consequences [b]			
c1. global environment	-0.55	1.18	201
c2. national economy	0.51	1.13	200
c3. national wellbeing	-0.13	1.25	201
c4. local environment	-1.16	1.07	200
c5. local economy	-0.19	1.28	201
c6. local health & safety	-0.58	1.21	201
c7. local lifestyle	-0.74	1.23	200
c8. local rights	-0.94	1.17	201
trust [c]			
t1. central government	2.13	1.19	200
t2. national companies	2.11	1.14	199
t3. foreign companies	2.15	1.23	199
t4. national engineers	2.89	1.21	199
t5. foreign engineers	2.84	1.31	199
group-id [d]			
g1. most-chileans	3.77	1.34	195
g2. proponents	2.17	1.1	191
g3. residents	2.74	1.25	191
g4. indigenous-chileans	2.84	1.51	195
g5. european-chileans	2.78	1.56	196

Note: [a] coded from -2 (very much opposed) to 2 (very much in favour), [b] coded from -2 (very negative) to 2 (very positive), [c] coded from 1 (no trust at all) to 5 (much trust), [d] coded from 1 (very little) to 5 (very much)

Acceptance

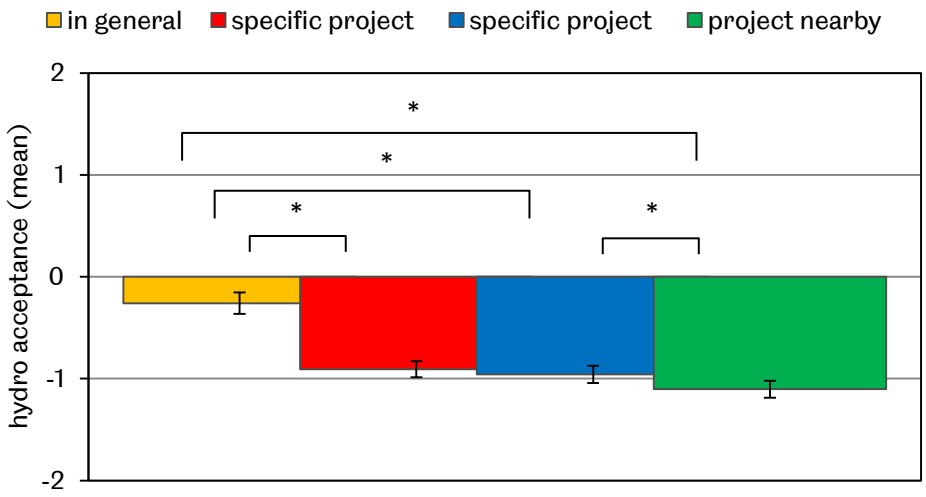
The mean scores for all the items that measured *acceptance* of hydro displayed negative values that are each significantly below the midpoint (t-tests against the midpoint at $p \leq .05$), indicating that the sample showed a mostly anti-hydro tendency.

A repeated-measures within-subjects ANOVA showed that there were significant differences between these items (see Figure 4.2), $F(1,192)=101.987$, $p<.001$. Bonferroni's post-hoc tests revealed that acceptance in general had significantly higher ratings than all the other items (all at $p<.01$), and that the hypothetical project nearby was rated significantly lower than the specific project 2, i.e. hidroaysén (as in a typical NIMBY effect, see Devine-Wright, 2009

for a discussion on such explanation for local opposition). The remaining comparisons were not found to be significant (at $p>.05$).

Figure 4.2 Mean scores of items measuring acceptance of hydro.

Coded from -2 (strongly opposed) to 2 (strongly in favour).



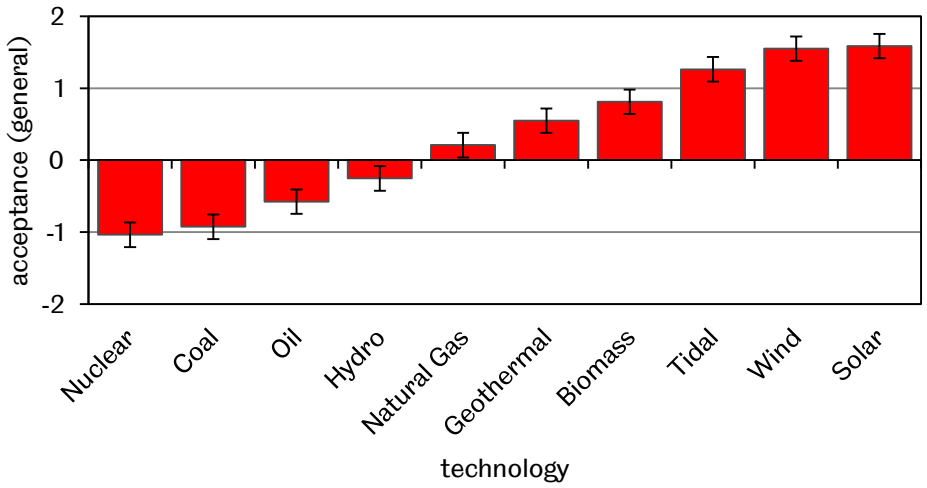
All of the acceptance items were largely correlated to each other (all between 0.575 and 0.882 at two-tailed $p<.001$), and showed a good index of internal consistency ($\alpha=.883$)[16]. Therefore, it was deemed appropriate to compute an average score to form a single composite measure of *acceptance* to be used as the main dependant variable in the regression analyses.

A within-participants comparison was conducted to compare equivalent items for the general acceptance of electricity generation technologies covered through the questionnaire. This allowed for the comparison of general preferences for hydro against the other energy technologies present or being considered within the Chilean context (see Figure 4.3).

[16] N.B. Deleting any of the items from the scale did not improve the Cronbach's alpha reliability indicator.

Figure 4.3 Mean score of acceptance of electricity generation sources

Coded from -2 (strongly opposed) to 2 (strongly in favour).



It was found that the general *acceptance* of technologies were significantly different from each other, $F(9,170)=106.957$, $p<.001$. Bonferroni's post-hoc tests showed that, as presented in Figure 4.3, hydro was significantly more accepted than both nuclear and coal (at $p<.001$), not significantly different from the use of oil (at $p>.05$), and significantly less accepted than all the remaining technologies (all at $p<.01$).

Consequences

Regarding the perceived consequences of hydro, t-tests (see Table 4.4) revealed that only consequences to the *national economy* were found on average to be positively evaluated (significantly above the midpoint at $p<.05$); and only *national wellbeing* was found not to differ from the midpoint (at $p>.05$). The remaining items were all found to be, on average, negatively evaluated (at $p<.05$).

Table 4.4 T-tests for consequences items vs mid-point

variable / items	*t*	*df*	*p*
consequences			
c1. global environment	-6.621	200	<.001**
c2. national economy	6.410	199	<.001**
c3. national wellbeing	-1.472	200	.143
c4. local environment	-15.297	199	<.001**
c5. local economy	-2.090	200	.038*
c6. local health & safety	-6.782	200	<.001**
c7. local lifestyle	-8.517	199	<.001**
c8. local rights	-11.326	200	<.001**

Note: *p<.05, **p<.001

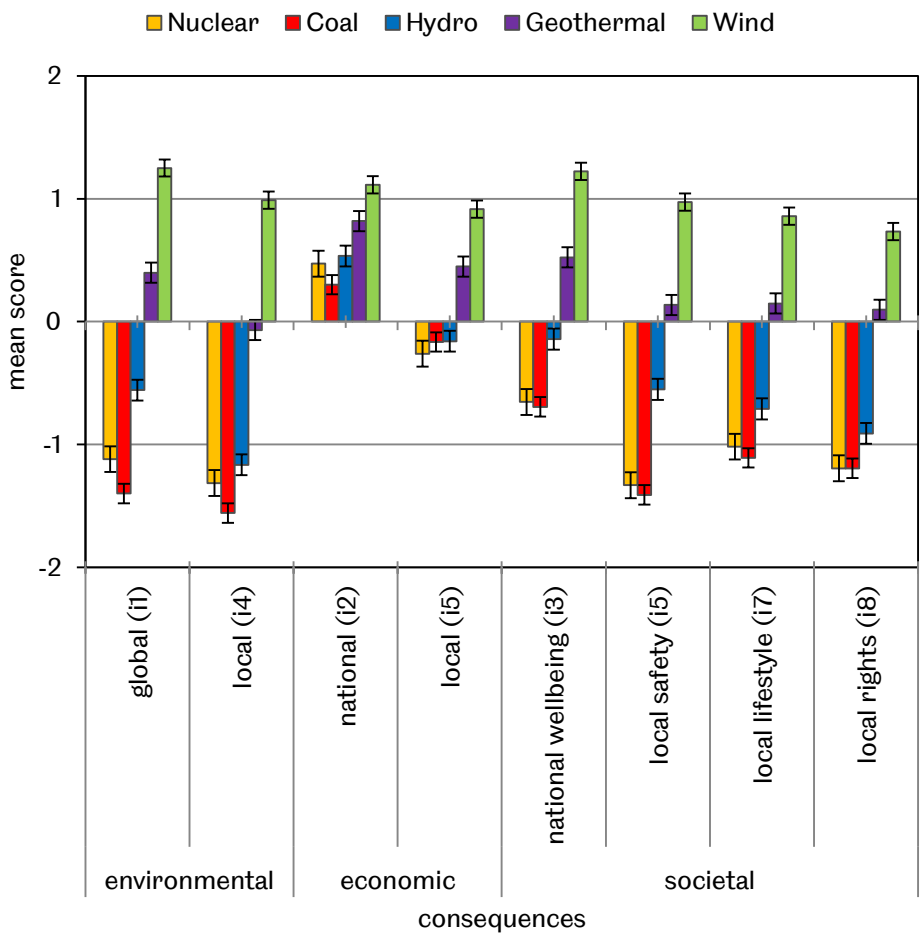
A within-subjects comparison of the items established that there were significant differences in ratings across criteria, $F(7,191)=62.631$, $p<.001$. Bonferroni's post-hoc tests confirmed the tendency revealed in Figure 4.4: the more positively evaluated consequences were *national economy*, followed by *national wellbeing*, and *local economy*. These were followed by the consequences for *local health and safety*, and the *global environment*. The more negatively evaluated consequences were *local lifestyle*, and finally, *local rights* and *local environment* (all differences at $p<.05$).

It was observed that all these items showed significant positive correlations with each other ranging from medium to large (all between 0.370 and 0.818, at two-tailed $p<.001$), and shared together an excellent index of internal consistency ($\alpha=.925$). All these findings suggest the operation of an underlying common variable that could account for much of the variability of the items (see the discussion section of this chapter for further comments on this). In this sense an exploratory factor analysis (PCA) showed that all the items loaded on a single factor accounting for 66.14% of the variance; and therefore, a single average *consequences* composite measure was formed.

Additionally, this set of items was used to compare how hydro's consequences are perceived in comparison to other energy sources (see Figure 4.4). In this sense, a within-participant MANOVA test revealed differences between the overall assessment of *consequences* of these technologies, $F(4,172)=127.400, p<.001$.

Figure 4.4 Mean scores of consequences items for five energy sources

Coded from -2 (very negative) to 2 (very positive)



Bonferroni's post-hoc tests revealed that in overall, hydro's *consequences* were evaluated more positively than nuclear and coal but more negatively than geothermal and wind (all at $p<.001$).

Trust in stakeholders

A within-subjects comparison of the trust items revealed that there were significant differences in the levels of trust held towards different stakeholders, $F(4,195)=30.289$, $p<.001$. Examination of Bonferroni's post-hoc tests revealed that the government, and companies were comparatively less trusted than scientists (all at $p<.001$). On the other hand, there were no significant differences linked to the nationality of the stakeholders (all at $p>.05$).

All these items correlated significantly with relationships ranging from medium to large (between 0.363 and 0.722, at two-tailed p<.001), and they shared a good index of internal reliability (α=.849). Additionally, an exploratory factor analysis (PCA) showed that all the items loaded on a single factor explaining for 62.61% of their variance. These results suggest that an underlying factor could explain them better, and hence an average *trust* composite measure was calculated for some of the remaining analyses.

Group-ids

Within-participant differences were found between *group-id* items, showing that participants, on average, identified themselves more with certain groups than with others, $F(4,187)=28.972$, p<.001. Bonferroni post-hoc tests showed that the group of *most-chileans* showed the highest identification ratings, significantly above the other groups (at p>.001). This was followed by identification with *residents* near to projects, *indigenous-chileans* and *european-chileans* (non-significantly different from each other at p>.05), which were significantly higher than identification with *proponents* of projects (at p<.001).

It was found that there were significant positive correlations between some of the items, as shown in Table 4.5. In this sense, those who identified themselves with *residents* near to projects also tended to identify themselves with *indigenous-chileans*. Also, significant associations were observed between *group-id* for *most-chileans* and *proponents* of projects; and between *group-id* for *european-chileans* with *proponents*, and *residents* (all at p<.05).

Table 4.5 Bivariate correlations between group-ids items

	g2	g3	g4	g5
g1. most-chileans	0.286***	0.073	0.072	0.218**
g2. proponents	-	0.149*	-0.043	0.268***
g3. residents		-	0.447***	0.167*
g4. indigenous-chileans			-	0.257***
g5. european-chileans				-

Note: * p <0.05, ** p<.01, ***p<.001 (two-tailed)

4.4.2 Bivariate correlations

Having developed composite measures for *acceptance*, *consequences* and *trust*, to address hypothesis 1, the correlations between these variables were analysed (see Table 4.6).

Table 4.6 Bivariate correlations between composite variables

	acceptance	*consequences*
consequences	0.787***	-
trust	0.504***	0.506***

Note: ***p<.001 (two-tailed)

As predicted (hypotheses I and II), acceptance, consequences, and trust were strongly and positively correlated (at p<.001), so that the higher the *acceptance* of hydro is, the more positive the perceived *consequences* are and the higher the levels of *trust* in stakeholders.

Correlations between *group-id* and the composite measures for *acceptance, consequences* and *trust* were analysed using the items for specific groups (see Table 4.7).

Table 4.7 Bivariate correlations between group-ids x other variables

	acceptance	*consequences*	*trust*
group-ids			
g1. most-chileans	0.100	0.181*	0.222**
g2. proponents	0.369***	0.450***	0.493***
g3. residents	-0.174*	-0.084	0.002
g4. indigenous-chileans	-0.340***	-0.286***	-0.211***
g5. european-chileans	0.107*	0.168*	0.227**

Note: * p <0.05, ** p<.01, ***p<.001 (two-tailed)

As predicted (hypothesis III), *acceptance*, *consequences,* and *trust* were significantly and positively correlated (at p<0.05) to *dominant group-ids* (i.e. *most-chileans, proponents,* and *european-chileans*). However, acceptance was not related to *most-chileans group-id* (at p>.05).

Additionally, as it was also predicted (hypothesis IV), *acceptance* was negatively correlated with *subordinate group-ids* (i.e. *residents*, and *indigenous-chileans*). However, *consequences* and *trust* only significantly negatively related to the *indigenous*-chileans *group-id* (at p>.05).

4.4.3 Multiple linear regressions

Having observed significant relationships between the variables of interest, additional analyses were conducted using multiple linear regressions on the composite *acceptance* measure, using the set of items for *consequences*, *trust*, *group-ids* and *demographics* respectively. This served to identify whether certain sub-aspects of each composite variable would account for the variance in *acceptance*. The results of these analyses are found in Table 4.8, of which only significant relationships will be commented on.

For the regression concerning *consequences* it was found that the items that had significant effects on acceptance were those referring to *global* and *local environment*; and about impacts on society, i.e. *national-wellbeing* and *local-rights* (all positive relations at $p<.05$).

For *trust*, the items which significantly explained some of the variance in acceptance were trust in the *central government* and in *foreign companies* (both positive relationships at $p<.05$).

The regression for *group-id* items revealed that the items which explained a significant proportion of the variance in acceptance were identification with proponents (positive) and with indigenous groups (negative), both at $p<.001$.

An additional *group-id* regression was performed removing items that referred to some group explicitly linked to electricity generation issues (i.e. items g2 and g3 in Table 4.8). This was done because it was found more likely that levels of identification with these groups could be more easily explained in terms of the attitudes of participants to energy issues (as an outcome rather than as a predictor), whereas items referring to ethnicity people are more likely to have a level of identification based on issues beyond aspects related to electricity generation. In the second regression, $F(4,188)=8.814$, Adj. $R^2=0.140$, $p<.001$, *european-chileans group-id* was observed to be an additional significant predictor with a positive relationship ($B=0.168$, $\beta=0.189$, $t=2.674$, $p=.004$). As such, this suggests that overlapping variance of *european-chileans group-id* with the two items that were removed, prevented the retention of former in the first regression model.

Table 4.8 Multiple linear regressions on acceptance of hydro

Predictors	*B*	*β*	*t*	*p*
Regression 1: *consequences*				
c1. global-environment	0.187	.209	3.452	<.001**
c2. national-economy	0.018	.019	0.358	.361
c3. national-wellbeing	0.113	.133	1.895	.030*
c4. local-environment	0.203	.206	2.904	.002*
c5. local-economy	0.048	.058	0.879	.190
c6. local-health & safety	0.034	.038	0.452	.326
c7. local-lifestyle	0.085	.099	1.061	.145
c8. local-rights	0.179	.199	2.229	.014*
(Constant) B=-0.217, *t* (197)=-2.55, *p*=.012*				
N=190, Adj. R^2=0.629, *F* (8, 189)=42.686, *p*<.001**				
Regression 2: *trust*				
t1. central government	0.270	.303	4.146	<.001**
t2. national companies	0.095	.103	1.087	.139
t3. foreign companies	0.178	.206	2.131	.017*
t4. national engineers	0.064	.073	0.763	.223
t5. foreign engineers	-0.008	-.009	-0.094	.463
(Constant) B=-2.137, *t* (198)=-12.045, *p*<.001**				
N=196, Adj. R^2=0.287, *F* (5, 195)=16.913, *p*<.001**				
Regression 3: *group-ids*				
g1. majority of chileans	-0.003	-.004	-0.063	.475
g2. proponents of projects	0.330	.344	4.923	<.001**
g3. residents near projects	-0.092	-.110	-1.505	.067
g4. indigenous-chileans	-0.225	-.288	-3.837	<.001**
g5. european-chileans	0.088	.100	1.429	.076
(Constant) B=-0.532, *t* (192)=-2.075, *p*=.02*				
N=191, Adj. R^2=0.227, *F* (5, 190)=12.167, *p*<.001**				
Regression 4: *demographics*				
d1. age	-.060	-.166	-2.175	.343
d2. gender (dichotomous)	.145	.067	0.856	.393
d3. ethnicity	.162	.121	1.573	.118
d4. parents' education	-.019	-.025	-0.341	.733
d5. political orientation (dichotomous)	.204	.095	1.264	.208
d6. knowledge	-.171	-.169	-1.953	.053
d7. interest	-.065	-.070	-0.848	.398
d8. climate change belief	-.112	-.106	-1.344	.181
(Constant) B=-1.054, *t* (174)=-1.148, *p*=.253				
N=167, Adj. R^2=0.072, *F* (8, 166)=2.695, *p*=.008*				

Notes: All regressions used the ENTER method and a composite measure of *acceptance of hydro* as the criterion variable. *B*=unstandardized coefficient, *β*=standardized beta coefficient. * *p*<.05, **p<.001 (one-tailed)

With regards to *demographics*, a first regression was run using all items as they were initially recorded, *F(*7, 71)=3.583, *p*=.002. This analysis revealed that the only item with a significant relationship was political orientation (B=0.341, β=.458, at *p*<.001). However since this measure had a very low response rate, it diminished the sample size by more than half (n=79). The second regression (in

Table 4.8) was run using a dichotomised version of this variable in which no item showed a significant relationship.

4.5 Discussion

4.5.1 Consequences

In the evaluative comparison of beliefs about the consequences of hydro, it was observed that the most negatively evaluated consequences of hydro were local effects on the environment and on people's rights. On the other hand, the only positively evaluated criterion was its consequences on the national economy. This, however, is unlikely to say much about how people might view hydro in terms of its broader acceptance, as Figure 4.4 reveals that even the most negatively evaluated technologies (i.e. coal and nuclear) had similarly positive ratings in terms of their benefits for the economy.

These notions are furthered through the regressions, where the effect on the economy was not found to be a significant predictor of *acceptance*, but environmental and societal issues were. This contrasts with the emphasis on economic issues found on the analysis of newspapers (Chapter 3), it might be the case people might be basing their views on the other *consequences* (i.e. environment, society), and under the influence of trust and *group-id*s.

The examination of the correlations within these items, supports the idea that most of their covariance might be better explained by a common underlying factor, which could be proposed to be an expression of an affect-heuristic (Slovic et al., 2002). Since there are positive correlations between all these items, it can be inferred that people are not necessarily making a thorough assessment of each criteria, and therefore, they might be relying on prior attitudes to make their preferences. In this sense people might have perhaps based their judgement not on a considered weighing up of the pros and cons but rather based on 'gut feeling' (Zajonc, 1980).

4.5.2 Trust

Results suggest that people might be relying on their trust in stakeholders to make their evaluations about the *consequences* of hydro (Siegrist, 2000), and

thus affecting the *acceptance* of it. Particularly relevant appear to be the government and foreign companies, but less so engineers. This can be taken as an indication that the most relevant issues about trust having influence on attitudes, are not related to having experts with adequate technical know-how, but instead might be based on political issues, and other specific aspects of the context, such as the type of relationships that companies have established with residents near to projects in the past, as described in Chapter 1, and suggested by Slovic (1993).

Although the directionality and nature of the relationships cannot be assumed (cf. Eiser et al., 2002), it can be proposed that the measures of trust used in this research would not be a mere by-product of attitudes towards hydro, because the survey was purposely designed to contain reference to a wide number of electricity generation sources to avoid forcing participant to think only about hydro when assessing energy issues.

4.5.3 Group-ids

As expected, significant relationships between identification with groups and outcomes were observed. While some of these associations are easy to explain as a consequence of prior attitudes, i.e. identification with proponents of projects and with residents near projects (because these refer specifically to electricity generation projects), the remaining ones are not as easy to explain without consideration of both psychological theory of intergroup behaviour; and the Chilean context previously described (Chapter 1).

In this sense, particularly interesting findings are the significant correlations and regressions related to the group-ids which are not explicitly related to the issues of electricity generation (i.e. most-chileans, *european-chileans* and *indigenous-chileans group-id*s), which confirm the predicted associations to issues of *acceptance, consequences,* and *trust*. These provide initial support for both types of expected *group-id* effects: through adoption of norms (Turner et al., 1987), and through the intergroup-bias effect on trust (Brewer, 1979, 1999, 2008; Tanis & Postmes, 2005). Specifically, since those with higher dominant *group-id*, showed higher levels of *acceptance*, more positive perception of *consequences*, and higher *trust* in stakeholders, it can be

speculated that this is the result of adopting the views of their group, and of an enhancement on trust in stakeholders (because they are members of the dominant-group). As well, observing that those with higher identification with the *subordinate group-id* showed the opposite tendency (i.e. less *acceptance*, more negative perception of *consequences*, and lower *trust*) suggested the operation of the same principles in a contrary direction.

However it must also be noticed that the effects of *group-id* do not appear to be caused by mere group categorization. For instance, *ethnicity per se* does not have a significant effect on acceptance of hydro (and neither on consequences nor trust at $p<.05$). In this sense, the effects of intergroup biases would not be generalised to the whole ethnic category by default, but instead, they depend on levels of identification with these groups.

4.6 Conclusions

A methodological approach for data collection was developed and used to record psychometric measures of the acceptance of hydro, and the perceived consequences of it, *trust* in stakeholders and *identification* with groups, along with *demographics*.

Analysis of the data showed supportive evidence for all the expected effects of these measures: positive perceptions of the consequences of hydro were positively correlated to acceptance; and trust in stakeholders also positively predicts and correlates with acceptance of hydro. Among the subthemes within each of these variables, it was found that environmental and some societal issues were of more predictive importance than economic issues; and that trust in the government and in foreign companies was more predictive than trust in scientists and national companies. These findings suggest that people might be relying on their perception of environmental and societal consequences, and on their levels of trust in stakeholders to make assessments of hydro.

Additionally *group-id*s showed different relationships with acceptance of hydro depending on the group under consideration, i.e. identification with the dominant group was found to positively correlate with acceptance, consequences and trust, while, contrariwise, identification with groups of

national minorities were negatively associated with these variables. In this respect, it was inferred that individuals might be adopting the prototypical norms of the groups they feel identified with, and enhancing (or deteriorating) their levels of trust in stakeholders depending on this same criterion through intergroup biases.

5 An experimental study of biases on trust

5.1 Summary

Having observed correlations between the variables of interest, an experimental approach was used to further elucidate the nature of the relationships between *group-ids, trust,* and *attitudes* towards hydro (understood here as a composite measure of *acceptance* and *consequences*). The experimental approach used a 3x3 design, with a text vignette for each condition that varied across two independent variables, i.e. text-valence (anti-hydro, non-evaluative, and pro-hydro), and text-source of the message (subordinate-source, no-source, dominant-source); *group-ids, trust,* and *attitudes* were recorded as covariates previous to the experimental conditions; whereas *text-credibility* (a form of trust), and *post-condition-attitudes* were recorded as dependant variables.

5.2 Introduction

In Chapter 4, it was found that in the Chilean media, the discussion surrounding hydro is framed differently by newspapers that represent dominant and subordinate groups (i.e. the dominant-sources were more pro-hydro and focused more on dominant-stakeholders; whereas the subordinate-source was more anti-hydro, and more focused on subordinate-stakeholders), suggesting different prototypical group norms for each group (cf. Hogg & Reid, 2006). Among other findings, in Chapter 4 it was observed that identification with dominant and subordinate groups was correlated with *acceptance*, *consequences*, and *trust;* suggesting that people were adopting the prototypical group norms from the groups to which they feel identified with (Turner et al., 1987), and enhancing the levels of trust as a result of intergroup biases (Brewer, 1979, 1999, 2008; Tanis & Postmes, 2005).

Having established these relationships with qualitative and correlational methods, it was considered that using an experimental approach could enable further exploration of the nature of the previously observed correlations, to

establish whether trust, consequences, and acceptance can be found to be the outcome of a *group-id* based framing of the national energy discussion.

Since in the previous chapter it was observed that *acceptance* and *consequences* shared high levels of collinearity, for this study the two concepts were merged into one: *attitudes* toward hydro, as in an associationist model of attitudes (Fazio, 2007). Nevertheless, further examination of whether *acceptance* and *consequences* can be considered as distinct constructs is presented in Chapter 6).

A 3x3 experimental approach based on the previous two studies was developed. In this sense, a questionnaire was devised with pre-condition measures, experimental conditions and post-condition measures (dependant variables). The full list of variables is found in Table 5.1.

Table 5.1 Variables in experimental design

CVs	IVs	DVs
pre-condition attitudes	text-valence (anti, pro, neutral)	text-credibility
trust		post-condition attitudes
subordinate-*group-id*	text-source (subordinate-source, dominant-source, unknown)	
dominant-*group-id*		

Note. CVs=covariates; IVs=independent variables; DVs=dependant variables.

The independent variables consisted of text vignettes about hydro which varied in terms of their valence (i.e., anti, pro and neutral views on hydro); and in source, to cover subordinate and dominant sources. Based upon the findings in Chapter 3, this was operationalized referring to *El Ciudadano* (sub-ordinate) and *El Mercurio* (dominant) newspapers respectively. Further details about the experimental conditions are given in the methods section.

For the purposes of this study, a series of hypothesis were proposed regarding the effects of interactions of between IVs with CVs on the DVs[17].

5.2.1 Hypotheses

A number of predictions were made which built upon the literature review and on the findings from previous chapters. These predictions are found in the hypotheses shown in Table 5.2.

Table 5.2 Hypotheses of the experimental study

Hypothesis I: Negativity-bias on trust. *Text-credibility* will differ between text-valence conditions: Text-credibility will be higher for *anti* conditions, and lower for *pro* conditions.
Hypothesis II: Confirmatory bias on trust. *Text-credibility* will be predicted by an interaction between *text-valence and pre-condition attitudes,* such that those with more positive *attitudes,* will report higher *text-credibility* in the *pro-condition;* whereas those with more *negative attitudes* will report lower *text-credibility (*and vice versa for the anti-condition).
Hypothesis III: Group-bias on trust (subordinate). *Text-credibility* will be predicted by an interaction between *text-source and subordinate group-id,* such that those with higher *subordinate group-id,* will report higher *text-credibility* under *subordinate-source* conditions, than *dominant-source* conditions (see Table 5.3).
Hypothesis IV: Group-bias on trust (dominant). *Text-credibility* will be predicted by an interaction between *text-source and dominant group-id,* such that those with higher *dominant group-id,* will report higher *text-credibility* under *dominant-source* conditions, than *subordinate-source* conditions (see Table 5.3).
Hypothesis V: Enhanced trust effect. An interaction between *text-credibility* and *text-valence* will predict *post-condition attitudes*, so that higher text-credibility will be associated with more favourable post-condition attitudes in the pro condition; and with less favourable post-condition attitudes in the anti-condition.

It would be expected that perceived text-credibility should vary according to its valence, for example by influence of a negativity-bias (Siegrist & Cvetkovich, 2001), so that that negative reports will be seen as more credible

[17] DVs would be expected to be predicted by the CVs, for example, pre-condition attitudes are likely to predict post-condition attitudes, and trust is likely to predict text-credibility; both because they refer to some measures of the same construct. Moreover, trust, subordinate and dominant group-ids CVs, would also be anticipated to predict post-condition attitudes, because the same correlations observed in the previous study were predicted. Focusing on these relationships only adds the value of seeking replication for the findings of the previous study.

than positive reports (hypothesis I). Additionally, in line with a confirmatory bias (White et al., 2003), it was also expected that the condition text will be considered more credible when it is consistent with a participant's pre-existing views about hydro (hypothesis II).

It was hypothesised that text-credibility would be also predicted by an interaction between the two *group-id*s with text-source (cf. Brewer, 1979, 2008). In this sense, people were expected to consider more credible the text in conditions where the depicted source is that of their in-group. In this sense, it was expected that participants with high subordinate *group-id* would consider the text as more credible when it was shown to be extracted from El Ciudadano, and less credible when it was from El Mercurio (hypothesis III) ; and for participants with high dominant *group-id* to show the inverse tendency (hypothesis IV), see Table 5.3.

Table 5.3 Interaction predictions for text-credibility

	IV: Text-source	
CVs: *Group-id*s	Subordinate-source	Dominant-source
Low subordinate *group-id*	-	+
High subordinate *group-id*	+	-
Low dominant *group-id*	+	-
High dominant *group-id*	-	+

Finally, it was expected that an interaction between text-credibility and text-valence would predict post-condition attitudes to hydro (hypothesis V). In this sense, it was expected that if credibility on the text was enhanced, participants would adopt a view in line with that expressed in the text (Hovland & Weiss, 1951; Zhu, Xie, & Gan, 2011), i.e. higher text-credibility being related to more positive post-condition attitudes in the pro-conditions (and vice versa for the anti-conditions).

5.3 Methods

5.3.1 Questionnaire

The experiment was operationalized in the form of a questionnaire. The survey was prepared reusing items from the previous study (Chapter 4), and

adapting a number of new items from other studies (outlined below). Items originally in English were translated into Spanish by the main researcher, and subsequently, with the collaboration of a professional translator and a postgraduate-level social psychologist, were back-translated into English to ensure that the items kept their original meaning. Items originally in Spanish, were translated into English with the same help to have complete Spanish and English language versions of the survey.

A cover letter explained the purposes of the study, ensured the ethical usage of the collected data, and instructed participants to carefully read all text within the survey. At the end of the survey, a debrief message was presented with a statement that explained that the survey contained an experimental component in the form of the vignette that they had read while responding to the survey.

The questionnaires were made accessible through the internet. The contents of the preceding letter, the questionnaire and the debrief message can be found in Appendix C in both languages.

The questionnaire had four parts: pre-condition measures (covariates), experimental condition (independent variables), post-condition measures (dependent variables), and demographics. The order in which the sub-sections comprising the different CVs were presented was randomised in order to counterbalance and dismiss potential effects associated to the order of items on the questionnaire. Full randomisation was used to allocate participants to the 9 experimental conditions. The parts of the questionnaire are described in the following sections.

Covariates

Participants were first required to complete a group of precondition measures. These refer to the key variables that were used in the previous study: (1) pre-condition attitudes towards hydro (composite variable from *acceptance*, and perceived *consequences)*, (2) *trust*, and (3) *group-id* (*dominant group-id* and *subordinate group-id*). Further details are found in Table 5.5.

For every item concerning hydro, an equivalent set of items were displayed in relation to four other electricity generation technology sources

(i.e. nuclear, coal, geothermal, and wind), as in the previous study, to allow participants to consider the broader context of energy alternatives.

Table 5.5 Measurement of CVs in survey

pre-condition attitudes (α=.914) Average score from 3 items about hydro measuring general acceptance and perceived consequences. The first item was used in the previous study, whereas the latter two were adapted from other studies in Chile (Bronfman et al., 2009). Examples: - State how much do you agree with the following statement (for each technology): "I believe that the development of this electricity generation source (hydro) is beneficial for Chileans". - State whether you are in favour or against using the following energy sources (hydro) for electricity generation in Chile
trust (α=.876) Average score from 6 items about trust in stakeholders, and 6 items about trust in newspapers. The first group of items were equivalent to those of the previous study, whereas the latter were added using an corresponding adaptation from other previous studies (Segovia et al., 2008). Examples: - State how much trust or distrust do you have in the following institutions in relation to their role in electricity generation in Chile (e.g. National companies, Central government)
dominant-*group-id* (α=.710) Average score from 5 items about identification with the national majority and dominant group, adapted from Kosterman & Feshbach (1989). Examples ("state how much do you agree with the following statements): - I am a typical Chilean - I identify myself with Chile
subordinate-*group-id* (α=.793) Average score from 3 items about identification with national ethnic minorities, adapted from Kosterman & Feshbach (1989). Examples ("state how much do you agree with the following statements): - - I see myself as part of an ethnic minority in Chile - - I feel connected to minorities in Chile

Note. See the full list of items in appendix C.

Independent variables

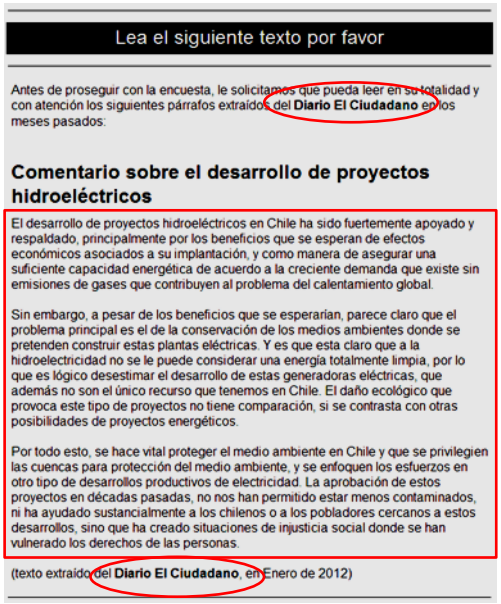
Participants were randomly assigned to one of nine conditions, all of which involved reading a vignette with a message referring about hydro. The condition varied across two factors: text-valence and text-source. Original versions of these vignettes in Spanish, and their translations to English are found in Appendix C. An illustration of how the two experimental factors were presented in vignettes is shown in Figure 5.1.

Figure 5.1 Illustration of two experimental conditions

Illustration of the arrangement of two of the nine experimental conditions

Sections highlighted with a red rectangle indicate the text-valence manipulation, and sections highlighted with a red oval indicate the text-source manipulation (red rectangles and ovals were not part of the questionnaire)

(a) anti-hydro and subordinate-source condition



Lea el siguiente texto por favor

Antes de proseguir con la encuesta, le solicitamos que pueda leer en su totalidad y con atención los siguientes párrafos extraídos del **Diario El Ciudadano** en los meses pasados:

Comentario sobre el desarrollo de proyectos hidroeléctricos

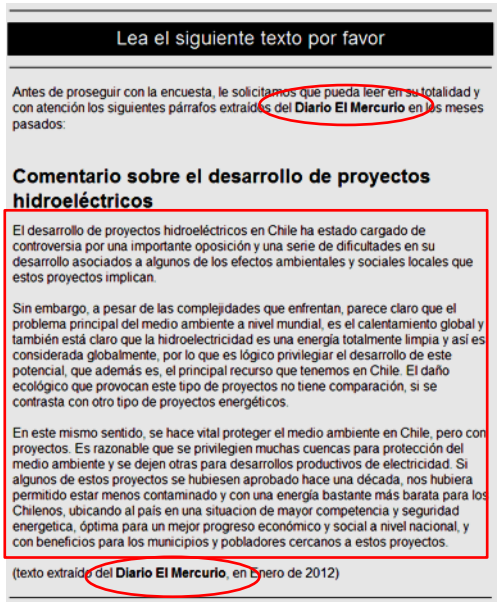
El desarrollo de proyectos hidroeléctricos en Chile ha sido fuertemente apoyado y respaldado, principalmente por los beneficios que se esperan de efectos económicos asociados a su implantación, y como manera de asegurar una suficiente capacidad energética de acuerdo a la creciente demanda que existe sin emisiones de gases que contribuyen al problema del calentamiento global.

Sin embargo, a pesar de los beneficios que se esperarían, parece claro que el problema principal es el de la conservación de los medios ambientes donde se pretenden construir estas plantas eléctricas. Y es que esta claro que a la hidroelectricidad no se le puede considerar una energía totalmente limpia, por lo que es lógico desestimar el desarrollo de estas generadoras eléctricas, que además no son el único recurso que tenemos en Chile. El daño ecológico que provoca este tipo de proyectos no tiene comparación, si se contrasta con otras posibilidades de proyectos energéticos.

Por todo esto, se hace vital proteger el medio ambiente en Chile y que se privilegien las cuencas para protección del medio ambiente, y se enfoquen los esfuerzos en otro tipo de desarrollos productivos de electricidad. La aprobación de estos proyectos en décadas pasadas, no nos han permitido estar menos contaminados, ni ha ayudado sustancialmente a los chilenos o a los pobladores cercanos a estos desarrollos, sino que ha creado situaciones de injusticia social donde se han vulnerado los derechos de las personas.

(texto extraído del **Diario El Ciudadano**, en Enero de 2012)

(b) pro-hydro and superordinate-source condition



Lea el siguiente texto por favor

Antes de proseguir con la encuesta, le solicitamos que pueda leer en su totalidad y con atención los siguientes párrafos extraídos del **Diario El Mercurio** en los meses pasados:

Comentario sobre el desarrollo de proyectos hidroeléctricos

El desarrollo de proyectos hidroeléctricos en Chile ha estado cargado de controversia por una importante oposición y una serie de dificultades en su desarrollo asociados a algunos de los efectos ambientales y sociales locales que estos proyectos implican.

Sin embargo, a pesar de las complejidades que enfrentan, parece claro que el problema principal del medio ambiente a nivel mundial, es el calentamiento global y también está claro que la hidroelectricidad es una energía totalmente limpia y así es considerada globalmente, por lo que es lógico privilegiar el desarrollo de este potencial, que además es, el principal recurso que tenemos en Chile. El daño ecológico que provocan este tipo de proyectos no tiene comparación, si se contrasta con otro tipo de proyectos energéticos.

En este mismo sentido, se hace vital proteger el medio ambiente en Chile, pero con proyectos. Es razonable que se privilegien muchas cuencas para protección del medio ambiente y se dejen otras para desarrollos productivos de electricidad. Si algunos de estos proyectos se hubiesen aprobado hace una década, nos hubiera permitido estar menos contaminado y con una energía bastante más barata para los Chilenos, ubicando al país en una situacion de mayor competencia y seguridad energetica, óptima para un mejor progreso económico y social a nivel nacional, y con beneficios para los municipios y pobladores cercanos a estos proyectos.

(texto extraído del **Diario El Mercurio**, en Enero de 2012)

In terms of the text-valence, the conditions were anti-hydro, pro-hydro, and non-evaluative. The anti-hydro and pro-hydro conditions referred to consequences of the technology, but differed in terms of the favourability in which they were framed. These conditions were worded similarly and had a similar length since they were both adapted from the same source, a pro-hydro article found in El Mercurio (on its online version) paraphrasing the words of one of the leaders of Colbún, and member of the Matte economic group[18].

[18]Original article found in:
http://www.emol.com/noticias/economia/2012/01/13/521521/matte-considero-razonable-la-propuesta--de-privilegiar-desarrollo-de-energia-hidroelectrica.html. Retrieved in the 13th of January, 2012.

For example, the anti-hydro contition contained statements as:

> *"[...] it is pretty clear that hydro cannot be considered a completely clean energy, and therefore, it is logical to dismiss the development of these power plants"*

> *"[...] approval of these projects in past decades, has not allowed us to have less contamination, nor it has substantially helped Chileans or residents near [...]".*

Whereas the pro-condition stated:

> *"[...] it is clear that hydro is a completely clean energy, and so it is considered globally, and therefore, it is logical to privilege these kinds of projects."*

> *"[...] if more previous projects would have been approved, we could have had less contamination, [...] cheaper energy, [...]; optimal for economic and societal progress [...]"*

On the other hand, the non-evaluative condition, was adapted from the first paragraphs of the Wikipedia article on hydro[19] and referred to some generic aspects of how hydro operates, without focusing on any consequence and attempting to omit any evaluative tone. For example, the beginning of the text stated:

> *"In a hydroelectric station, hydraulic energy is used to generate electricity. These are the result from the evolution of old watermills that used the current of rivers to move a wheel [...] these stations use the potential energy that a mass of water from a natural river bed possesses when there is a slope, which is also known as the geodesic curve."*

Regarding *text-source*, the conditions were *subordinate-source, dominant-source, and unknown-source*. Both the *subordinate-source* and the *dominant-source* conditions refer to a line of text displayed both in the top and bottom of the message, and stated from where the message had supposedly been extracted. In these conditions the text stated either "extracted from El Mercurio"

[19] Found in http://es.wikipedia.org/wiki/Central_hidroeléctrica. Retrieved on the 13th of January, 2012.

(*dominant-source*), or "extracted from El Ciudadano" (*subordinate-source*). In the *unknown* condition this line was not present.

Dependant variables

After the vignette condition, each participant responded to a number of post-condition items measuring text-credibility and post-condition attitudes towards hydro. More details about these variables are found in Table 5.6. For every item related to hydro, an equivalent set of items were displayed in relation to four other electricity generation technology sources.

Table 5.6 Measurement of DVs in survey

text-credibility (α=.935) Average score from a 3 item scale about the perceived credibility assigned to the text vignette. Examples ("state how much do you agree with the following statements"): - I consider the text to be credible - I perceive that the contents have been written with veracity
post-condition attitudes (α=.919) Average composite score of 8 items about consequences of hydro and 2 items regarding the acceptance of projects. These items were used in the previous study. Example: - Considering each of the following criteria, state how good or bad do you think it is the development of hydro power stations in Chile (e.g. national economy, local enviornment, local rights)

5.3.2 Sample

A total of 4400 invitations were sent to undergraduate students of Universidad Católica de Temuco via their institutional e-mail addresses, which were provided by the University's authorities. A group of 279 students accessed the questionnaire and responded it satisfactorily (above 70% of the items). It was observed that the students who responded the questionnaire were not significantly different from the rest of those invited in terms of their age, gender or their chosen area of study (all at $p>.05$).

The final sample had an average age of 22.3 years (SD=3.16), and was 61.6% female. Age and gender did not vary significantly across the experimental conditions (all at $p>.05$). The larger number of females is explained in terms of the proportions of the general student population at this university.

Equality across experimental conditions

The proportional allocation of participants to the experimental conditions, showed that none of the nine possible vignettes was significantly overrepresented, $\chi^2(df=4)=0.472$, $p=.976$, with ~31 cases per condition (with a range from 29 to 36 participants for each condition).

MANOVAs were used to test the assumption of independence between covariates and independent variables. Through Pillai's trace tests, it was observed that there were no significant differences in any of the covariates across conditions in both the text-valence manipulation, V=.22, $F(8,544)=.751$, $p=.646$; and the text-source manipulation, V=.16, $F(8,544)=.533$, $p=.832$. The same was true for demographic information: age; gender, political orientation (all at $p>.05$). With the results of these preliminary analyses, it was considered that randomisation of cases to conditions was successful.

5.4 Results

The testing of hypotheses was carried out through two ANCOVA models with interaction terms (as described in Hayes, 2005). Simple slopes analyses were used for exploring and plotting the nature of significant interaction terms (procedures in Hayes & Matthes, 2009).

5.4.1 ANCOVA on text-credibility

A between-subjects ANCOVA was run on the text-credibility dependant variable, entering CVs (for control), IVs, and relevant interactions. The full list of terms entered in the analysis and the statistical results are found in Table 5.7.

Table 5.7 ANCOVA on text-credibility

Term	*df*	F	eta-sq	p
CVs				
subordinate group-id	1, 259	0.029	<0.001	.866
dominant group-id	1, 259	0.057	<0.001	.812
trust	1, 259	7.796	0.029	.006*
pre-condition attitudes	1, 259	12.357	0.046	.001*
IVs				
text-valence	2, 259	8.381	0.061	<.001*
text-source	2, 259	2.327	0.018	.100
Interactions				
text-valence x text-source	4, 259	0.363	0.006	.835
text-valence x pre-condition attitudes	2, 259	15.484	0.107	<.001*
text-source x subordinate group-id	2, 259	0.183	0.001	.833
text-source x dominant group-id	2, 259	3.463	0.026	.033*

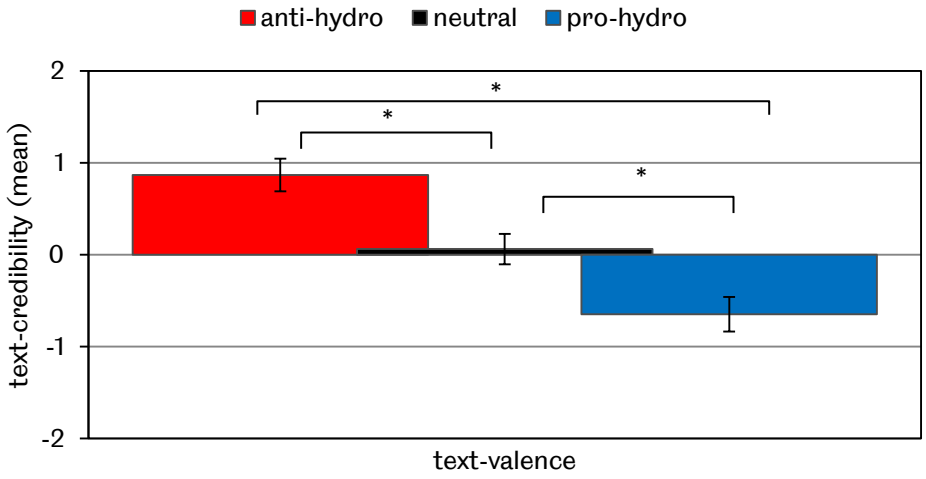
Note: * $p<.05$

Regarding CVs, there were non-significant main effects for majority-identification and minority-identification; however, there were significant main effects for trust in institutions and pre-condition attitudes towards hydro. These results reveal that peoples' trust in institutions and pre-condition attitudes toward hydro, predicted text-credibility, regardless of text-valence or text-source. An interpretation of these relationships is that those who trust more in stakeholders and have more pro-hydro attitudes, might also tend to be comparatively more trustful in general terms (cf. Slovic, 1993).

Regarding the experimental conditions, a significant main effect for text-valence was observed. Bonferroni's post-hoc tests revealed that as predicted in hypothesis I and illustrated in Figure 5.2, participants found the anti-hydro message more credible than the neutral or pro-hydro message (p=.003 and p<.001 respectively) and that the text-credibility for the neutral condition was significantly higher than for pro-hydro message (p=.004). This means that regardless of other variables, people perceived the anti-hydro vignette to be more credible, and the pro-hydro message to be less credible.

Figure 5.2 Marginal means for text-credibility by text-valence conditions

Higher text-credibility scores represent higher perceived credibility of the vignette text.

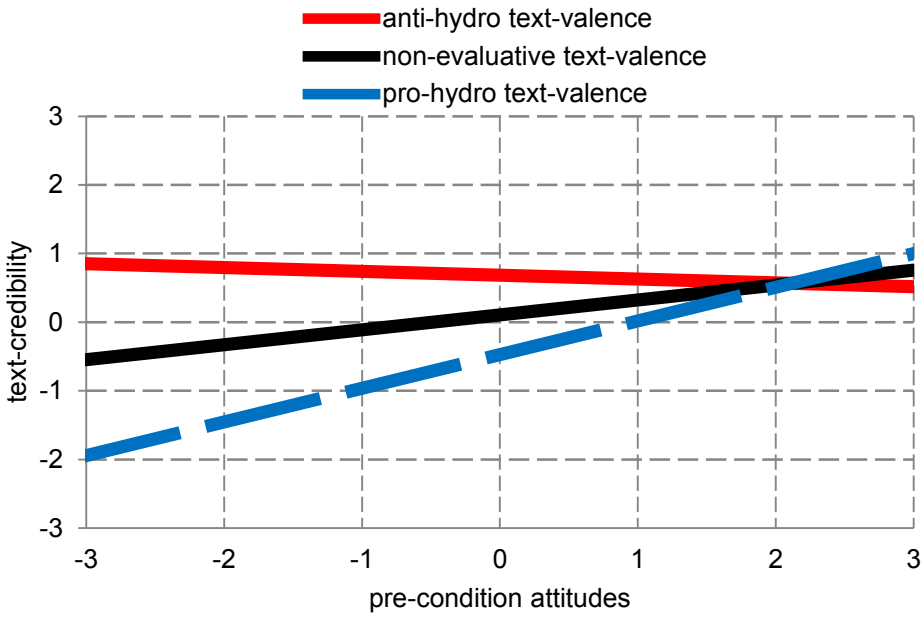


On the other hand, the main effect of the text-source was not significant, and neither was the interaction between IVs, i.e. neither the source of the message, nor its interaction with its valence had an impact on the credibility of the message.

An interaction term between pre-condition attitudes towards hydro and text-valence proved to be significant in the analysis. Simple slopes analyses revealed the nature of this moderation (depicted in Figure 5.3): beta-values between pre-condition attitudes towards hydro and text-credibility were -0.045, p=.538, for the anti-hydro condition; 0.212, p<.001, for the neutral condition; and 0.469, p<.001, for the pro-hydro condition.

Figure 5.3 Simple slopes for the confirmatory bias effect

Higher text-credibility scores represent higher perceived credibility of the vignette text. Higher pre-condition attitude scores represent more positive attitudes towards hydro.



These results reveal that as predicted (hypothesis II), text-credibility was influenced by people's previously formed attitudes on the subject, so that they considered more credible those messages that reflected the views that they already had (i.e., a confirmatory bias). So that the pro-hydro condition was perceived to be less credible by those with negative pre-condition attitudes, and more credible by those with positive pre-condition attitudes.

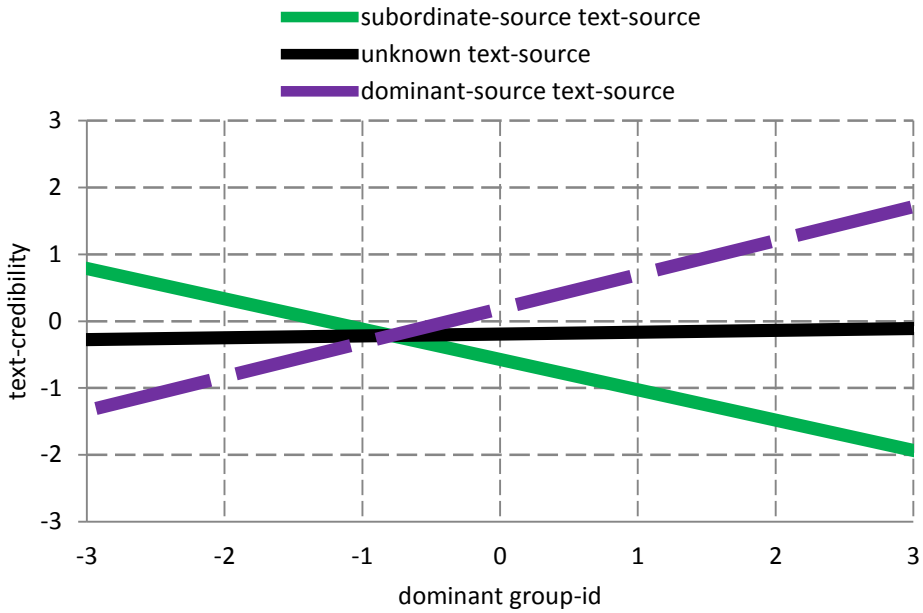
Group biases on credibility were assessed by including two additional terms in the analysis: an interaction between subordinate *group-id* and text-source, and an interaction between dominant *group-id* and text-source. Contrary to what was predicted (hypothesis III); the first of these terms did not have a significant effect (see discussion section for further comments on this result). On the other hand, as predicted (hypothesis IV), there was a significant interaction effect for the latter of these terms.

Further simple slope analyses of this interaction (depicted in Figure 5.4), revealed that the beta-values for the relationship between dominant *group-id* and text-credibility were -0.147, p=.253 for the subordinate-source condition;

0.011, *p*=.908 for the no-source condition; and 0.168, *p*=.155, for the majority-oriented condition.

Figure 5.4 Simple slopes for the dominant group-id intergroup bias effect

Higher text-credibility scores represent higher perceived credibility of the vignette text. Higher dominant group-id scores imply higher identification with the dominant group.



The fact that the beta-values were non-significant within a significant interaction should be understood as follows: text-credibility did not significantly vary between participants with low dominant *group-id* and high-dominant *group-id* within each of the text-source conditions. However, the text-credibility for text-source conditions, differed for participants with low dominant *group-id*, so that they considered the subordinate-source to be more credible, and the dominant-source to be less credible; whereas participants with high dominant *group-id* perceived that the dominant-source was more credible, and the subordinate-source as less credible (see Figure 5.4).

Therefore, the nature of the relationship for dominant *group-id* with the *text-credibility* form of *trust*) was found to be two-fold: enhancement of the ingroup-source, and derogation of the out-group source.

5.4.2 ANCOVA on post-condition attitudes

A between-subjects ANCOVA was carried out on the *post-condition attitudes* toward hydro to test whether its variance could be explained by an enhanced *text-credibility* across conditions. The full list of terms entered in the analysis and the statistical results is found in Table 5.8.

Table 5.8 ANCOVA on post-condition attitudes towards hydro

Term	*df*	*F*	*eta-sq*	*p*
Covariates				
text-credibility	1, 265	12.323	0.044	.001*
pre-condition attitudes	1, 265	219.461	0.453	<.001*
Experimental conditions				
text-valence	2, 265	8.359	0.059	<.001*
text-source	2, 265	0.889	0.007	.412
Interactions				
text-valence x text-source	4, 265	0.566	0.008	.687
text-valence x text-credibility	2, 265	8.008	0.057	<.001*

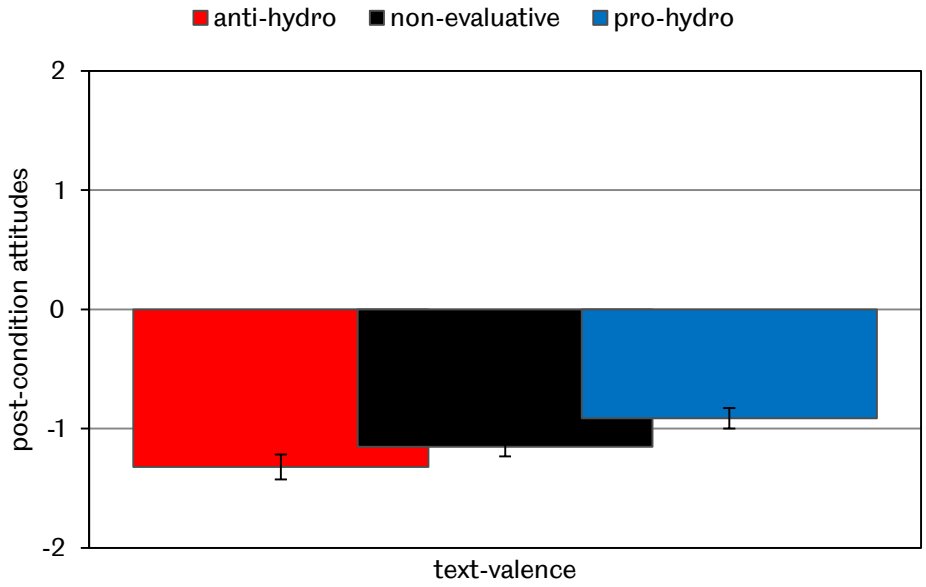
Note: * $p<.001$

There was a significant main effect of text-credibility, such that people with more positive attitudes towards hydro showed a tendency to perceive vignettes as more credible, regardless of the experimental condition they were in. Additionally, there also was a significant main for pre-condition attitudes towards hydro, confirming that pre-condition attitudes predicted post-condition attitudes toward hydro.

Having controlled for the covariates, a significant main effect was found for the text-valence manipulation. As shown in Figure 5.5, Bonferroni post-hoc tests revealed that the marginal means of post-condition attitudes were significantly higher for the pro-hydro condition in comparison with the non-evaluative ($p=.003$) and anti-hydro conditions ($p<.001$); although that these last two were not significantly different ($p>.05$). These results suggest a tendency for those assigned to the pro-hydro vignette to show less negative post-condition attitudes towards hydro, whereas those in the remaining conditions showed more negative post-condition attitudes. It is worth noting that even people allocated to the pro-hydro condition were not favourable to hydro.

Figure 5.5 Marginal means for post-condition attitudes by text-valence

Higher post-condition attitudes scores represent more positive attitudes towards hydro.

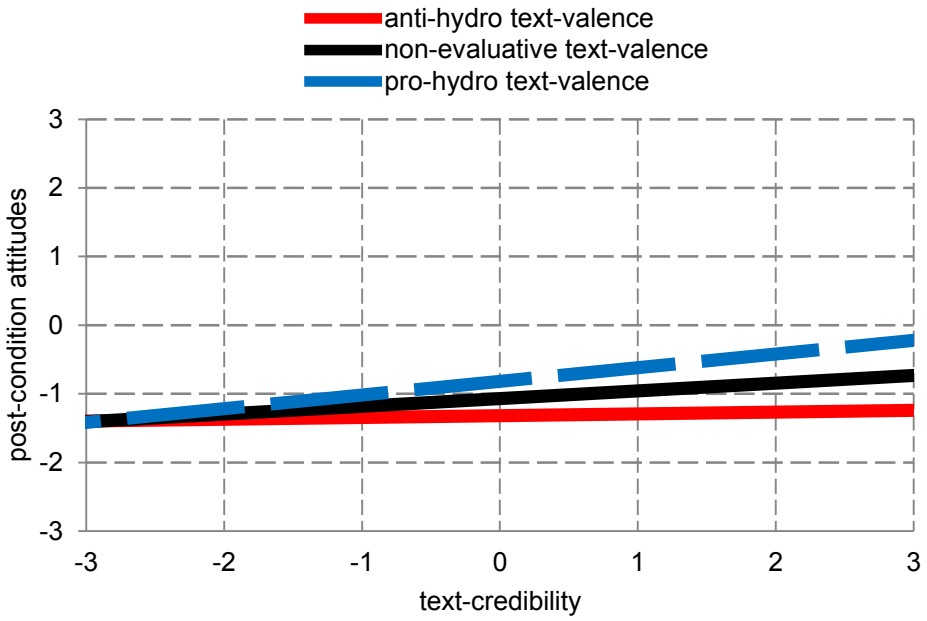


On the other hand, there was no significant effect for the text-source manipulation, and for the interaction effect between the two experimental conditions (i.e. neither the source of the presented message per se, nor its association with any text-valence had a direct impact on post-condition-attitudes).

Finally, a significant effect was found for the interaction term between text-credibility and text-valence (hypothesis V). Further simple slopes analyses, as plotted in Figure 5.6, revealed that the beta values for the relationships between text-credibility and post-condition attitudes toward hydro were 0.025, p=.554, for the anti-hydro condition; 0.113, p<.001, for the non-evaluative condition; and 0.199, p<.001, for the pro-hydro condition.

Figure 5.6 Simple slopes for the enhanced trust effect

Higher text-credibility scores represent higher perceived credibility of the vignette text. Higher post-condition atttitudes scores represent more positive attitudes towards hydro.



These findings show that text-credibility was related to enhanced post-condition attitudes in the neutral and pro-hydro conditions. However, there was not a detriment effect of text-credibility for the anti-hydro condition, probably because the anti-hydro text is largely confirming what most people already think or know to be controversial of hydro, or simply because negative attitudes could not get any more negative in the survey's scale (i.e., a floor effect).

5.5 Discussion

5.5.1 Negativity and confirmatory biases

The results revealed that participants responded to the questionnaire following commonly reported biases. In this sense, regarding the negativity bias, it appears to be the case that people were more trustful of messages that highlighted negative events and consequences, and distrustful in messages that emphasize positive aspects. This might relate to an asymmetry in people's perceptions, where they consider certain pessimistic scenarios as more probable; thus enhancing the credibility of the message (Siegrist & Cvetkovich, 2001).

Additionally, this might reflect that with a negative report of hydro, the controversial nature of the topic is acknowledged, whereas in a mostly positively-framed message, an emphasis on benefits might led participants to perceive that the controversy was being overlooked (and therefore the message was less honest). Moreover, in the pro-hydro condition, participants might have felt that they were trying to be persuaded, and therefore, might have adopted a more critical stance against the text.

On the other hand, the confirmatory bias which was also observed reveals that people tend to rely more on those who explicitly share their views (White et al., 2003). This can be interpreted in terms of inferred shared values, i.e. when the communicator reveals the same attitudes of people; they attribute the same positive values and capabilities that they perceive to have themselves, therefore enabling reasons to perceive them as more trustworthy.

5.5.2 Subordinate and dominant group-biases

It was observed the existence of group-biases in relation to the *dominant group-id*. In this sense, depending on the levels of identification with the dominant group that were held by participants, different sources were perceived as more, or less credible. In this sense, it can be interpreted that people rely on the groups to which they perceive they belong to, to make judgements about the trustworthiness of others (communicators in this case), so that trust in in-group members is enhanced, and trust in out-group members is derogated (cf. Brewer, 1979, 1999, 2008; Tanis & Postmes, 2005).

Nevertheless, this trend was only true for the dominant *group-id*, and not for the subordinate *group-id*. This could reflect that the identification with different groups might have ways of impacting on people's attitudes. And therefore, the impact observed in the previous study for subordinate *group-id* might be better explained in other terms rather than by group-biases on trust (e.g. by the effect of shared norms and values within that group).

5.5.3 Enhanced trust effect

The relationships between text-credibility and post-condition attitudes (even after having controlled for pre-condition attitudes), suggest that the impact of negativity, confirmatory and group biases on trust, could also have an

indirect impact on attitudes. According to the Elaboration Likelihood Model of persuasion (Petty & Cacioppo, 1986), the effect of trust or credibility on attitudes could be explained in two ways: as a cue, or as a motivation for consideration of arguments.

The cue effect, would refer to a case, for example, where participants (for whatever reason) end up perceiving that a communicator as trustworthy (i.e. it knows-well about a subject, or it holds similar values); they might assume that the communicator must be right, and since people are motivated "to be right", they adopt the communicator's viewpoint.

On the other hand, an effect of credibility as a motivation for further consideration of arguments refers to situations where participants (for whatever reason) perceive that a communicator as trustworthy, and therefore, they feel moved to seriously consider the arguments that the counterpart is making, and therefore, might end up persuaded, if they consider that the arguments are worthy.

This study does not provide enough information to establish which of these two paths was the most prominent; although it could be speculated that due to the time and interaction constraints of the nature of the experiment, many people might have been reliant on credibility as a cue. Nevertheless, both forms of influence could have been present.

Finally, it was observed some evidence of persuasion across manipulations and interactions, although none of these were as strong as to turn the average post-condition attitudes to positive. This can be explained in terms of the limitations of persuading people through online questionnaires, especially if people have strong attitudes against hydro.

5.6 Conclusions

Through an experimental approach based on the prototypical normative role of newspapers, a series of biases on trust in communicators were identified in relation to the Chilean context of electricity generation. These biases include the negativity and confirmatory biases. Overall, people trusted more in sources which depicted negative aspects of hydro, but they also considered more trustworthy the messages that represented and confirmed their previous views.

Moreover, it was found that there was some influence of *group-id*s, so that there were differences in the perceived credibility of text depending on the source that the text referred to. It was observed that there were both in-group enhancement, and out-group derogation effects. However, this was true only for measures of identification with the dominant group, whereas identification with the subordinate group did not make a difference in this respect. This might be indicative of different influence effects for both groups, so that the relationship between attitudes to hydro and identification with the dominant-group could be better explained to be mediated by trust, whereas the relationship of attitudes with identification with the subordinate group could be understand as the result of other processes (i.e. adoption of norms or values).

Finally, the enhancement of credibility in the pro-hydro conditions were associated with to attitudes becoming less negative, which could reveal a form of successful (but small) persuasion as a result of the previously outlined biases.

6 A comparative assessment of competing theoretical models

6.1 Summary

Considering the many alternative theoretical models that could explain the relationships between *acceptance, consequences, trust, and group-ids, t*hree competing models were identified and assessed through SEM. The represented models are the causal chain, heuristic, and associationist models of trust. Fit indices are assessed for every model to establish which one is statistically preferred; and that model is used to assess significant indirect effects.

6.2 Introduction

The literature review (Chapter 2), and the findings reported in previous chapters, suggest that there are different explanations that can be used to explain the relationship between the variables of interest of this research (*acceptance, consequences, trust, and group-ids),* so that the variables could be understood either as predictors or as outcomes (alternative explanations are summarised in Table 6.1).

Table 6.1 Alternative predictor and outcome roles for variables of interest

Variable	Role as a predictor	Role as an outcome
Consequences	Perceived consequences of hydro will influence people's acceptance of it	Perceived consequences of hydro might be the expression of people's underlying attitudes
Trust	People might rely on their degree of trust in stakeholders to assess whether they consider that the consequences of hydro are positive or negative	Trust in stakeholders might be the expression of people's underlying attitudes towards what they are proposing
Group-ids	Group-ids might influence views of hydro through the assimilation of group norms and values by its members, and/or through the enhancement or deterioriation of trust that occurs for in-group and out-group members respectively	People could also seek to be identified with groups that represent their views, and/or with those who they consider to be trustworthy.

To overcome the fact that variables can play different roles, as commented in Chapter 2, models have been proposed to explain the existing relationships in an integrative account, i.e. the causal-chain and the associationist models of trust are competing explanations that have found support across empirical examination of diverse phenomena (Bronfman et al., 2012; Eiser et al., 2002; Poortinga & Pidgeon, 2005; Siegrist, 1999, 2000).

Methodologies to analyse what models are more adequate vary across studies; however, there is a growing consensus among methodologists that the assessment of models using structural equations with latent variables (SEM) is a superior statistical technique to the more commonly used alternatives (e.g. repeated linear regressions, Baron & Kenny steps, Sobel tests, and partial correlations)[20]. Moreover, the use of SEM allows the consideration of complex models that acknowledge indirect effects (Hayes, 2009; Iacobucci, Saldanha, & Deng, 2007; MacKinnon, Fairchild, & Fritz, 2007; MacKinnon & Fairchild, 2009; MacKinnon, 2008; Rucker, Preacher, Tormala, & Petty, 2011).

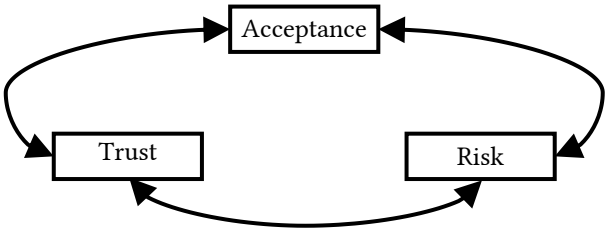
[20] SEM is superior for assessing mediations, with less Type I and II errors when properly executed.

However it has been also noted that the use of these techniques is associated with a number of problems (Kline, 2011; MacCallum & Austin, 2000; MacCallum & Wegener, 1993; Raykov & Marcoulides, 2001). Among these problems, one of the most relevant ones in the current context is the confirmatory bias in model testing. This refers to the case when researchers only assess the models which seem plausible from their points of view (i.e. without a proper evaluation of theoretically-sound competing models); and ignoring that even their models might have statistically-equivalent explanations (see Figures 6.1 and 6.2).

In this sense, it is striking that none of the studies referenced through the literature review, that have presented evidence in support of causal-chain models (nor many others studies examined through the review process) have actually tested whether an associationist model would fit the data. Also, it was noted that every model preferred in these articles could be accounted by numerous alternative statistically-equivalent explanations that are not even mentioned. Indeed, to date, there appears to be the case, that there are no studies assessing an associationist view of trust, as proposed originally by Eiser et al. (2002), using structural equations. For these reasons, it seems urgent to develop an analysis strategy in which competing theoretical models are compared.

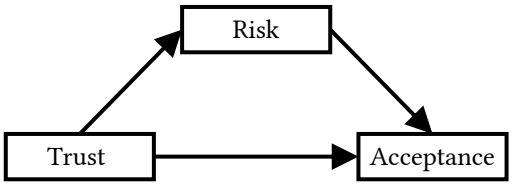
A problem that researchers might have encountered if they had aimed to assess associationist models of trust is that of statistically-equivalent models. In this sense, Figures 6.1 and 6.2 respectively depict and describe models which represent different plausible theoretical meanings, but in statistical terms are completely equal. This means that they all will exhibit exactly the same model-fit statistics in structural regressions, making it impossible to distinguish whether any offers a superior explanation for the variance observed in the data.

Figure 6.1 Three statistically-equivalent models to be dismissed



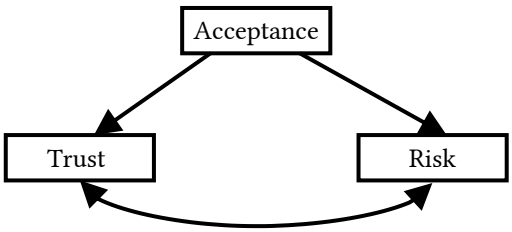
(a) no-theory

This model acknowledges that the three variables significantly share bivariate covariance, without making assumptions about the direction of the relationships. This model is equivalent to an absence of theory.



(b) modified causal-chain model

This is a causal-chain model where there is a causal-chain from trust to acceptance through risk, but an additional path is added between trust and acceptance. Such an approach is an adequate representation of analyses made in previous studies, but might not be the adequate representation of a causal-chain model in a structural equation, since no theoretical explanations are provided from such approach for the nature of a direct relationship beteween trust and acceptance. A version of this model was used by Bronfman et al. (2012).



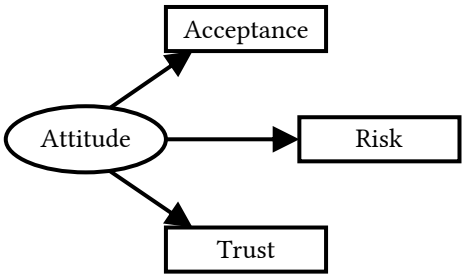
(c) modified associationist model

This model as presented by Eiser et al. (2002), it proposes that trust and risk perception are better explained by a common underlying attitude, expressed in the model by the acceptance variable. Since some shared variance might remain unexplained, significant correlations might be found between trust and risk. This model is an adequate representation of the analyses made in previous studies, but is not the adequate representation of the theoretical approach in a structural equation, since it does not reflect that all the variables are better explained by an underlying common factor. A version of this model was used by Poortinga & Pidgeon (2005),

One way to partially solve this problem is to test models that are strict representations of the assumptions that define theoretical approaches (Kline, 2011). In this sense, models in Figure 6.1 should be dismissed because: model (a) does not provide any theoretical account (it can be used as a baseline model though), model (b) because the direct regression of trust on acceptance has no meaning within the causal-chain view of trust as theoretically proposed (instead, a model without such regression should be chosen to represent a causal-chain, as in Figure 6.3). As well, model (c) should also be dismissed, since the theoretical assumptions of the associationist view in SEM are better explained by model (d) in Figure 6.2 (i.e. the shared variance is explained by common factor).

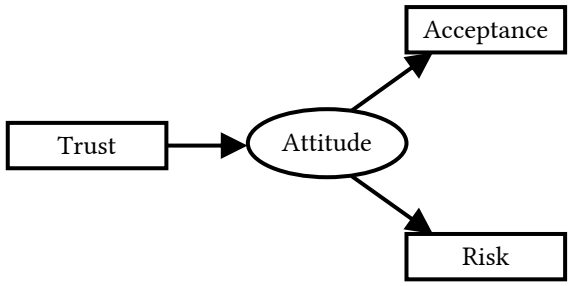
Furthermore, it was noticed the absence of an intermediate model in which trust is acknowledged to have an effect on acceptance, but not through changes on the perceived risks, but instead through an underlying attitude. Such model would reflect the views of Slovic (1993) on trust in relation to the and the claims of the affect heuristic (Finucane et al., 2000; Slovic et al., 2002); or the proposition of the ELM, where credibility has as *cue* effect (Petty & Cacioppo, 1986). Therefore, a "trust heuristic model" is here proposed (which is statistically-equivalent to the revised associationist model outlined when measuring only three observed variables), and found in Figure 6.3.

Figure 6.2 Two statistically-equivalent but conceptually different models



(d) revised associationist model of trust

The model as portrayed in previous studies does represent the analyses of partial-correlations; in a structural model however, it represents the wrong assumption that "acceptance" itself is the variable that explains the remaining relationships. Instead it is here proposed this statistically-equivalent model that correctly represents the theoretical view where acceptance, risk and trust are explained by an underlying latent variable, i.e. attitude.



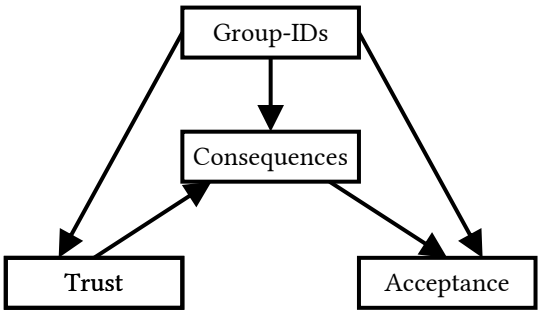
(e) trust heuristic model

This model represents the notions of the affect-heuristic, without the full associationist interpretation on the role of trust. This model is not acknowledged in previous discussions and provides an intermediate point between a causal-chain model and an associationist model. Acceptance and risk are explained by an underlying latent variable, i.e. attitude; on which trust has a direct effect as a heuristic.

To distinguish which models are more adequate, experts suggest that the network of relationships should be extended beyond three variables, by adding more variables with relations that are meaningful to each model. It is expected that when the relationship networks are made more complex, the models that are a better explanation will keep their strength (Chin, 1998, Kline, 2011).

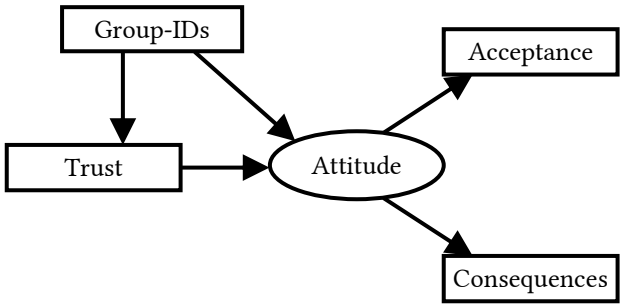
Therefore, including *group-id*s as an additional variable might help to clarify the nature of the relationships between the other variables as well. In this respect, three models could account for the relationships between the variables of interest, and are proposed for examination in Figure 6.3.

Figure 6.3 Three proposed competing extended models



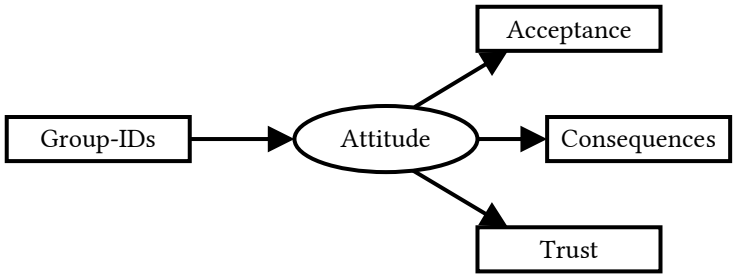
(a) causal-chain model (with dual effects of *group-id*)

Represents an extension of what is proposed by the causal-chain model of trust when acknowleding effects of *group-ids*.



(b) trust-heuristic model (with dual effects of *group-id*)

Represents the view of an intermediate point between a causal-chain and an associationist view, acknowledging effects of *group-ids*.



(c) associationist model (with *norm* effect of *group-id*)

Represents the associationist view of trust acknowledging an effect of *group-ids*. An effect of identities on trust is dismissed because the theoretical view suggests that it is already explained by the attitude.

In these models the original notion of *risk* has been replaced by *consequences*, to represent the measures in this thesis' studies, and an additional proposed model not previously discussed in the literature was incorporated (model b in Figure 6.3). In this model, acceptance and consequences can have an underlying common explanation (unlike the causal-

chain model), but trust is not necessarily explained by that same latent variable, and so it that it can have a meaningful effect on attitudes (unlike the associationist model). Testing these models will allow the identification of which one is statistically superior, by exhibiting a better fit to the data. Additionally, these provided a further look into the types of effects that have been previously described for *group-id* (i.e. direct effects via norms and values, and indirect effects via trust).

Nevertheless, it must be considered that even when most biases are avoided, SEM has many limitations and resolving what are the best explanatory causal paths for statistically-equivalent models cannot be fully achieved without the additional input of experimentation, or with additional contextual information that can validate the models with a strong theoretical sense that is also contextually meaningful (Kline, 2011).

6.3 Methods

The sample used for the analyses of Chapter 4 (n=201) was considered large enough to perform factor analyses and to test structural equation models (Kline, 2011; Tabachnick & Fidell, 2012), and therefore the models of interest were tested using the same dataset.

Although the competing models were initially tested using every item that was measured for the key variables; in accordance with the suggestions of many researchers (e.g. Kline, 2011) it was finally opted to only use a smaller set of

items to enable a more concise report of results, avoiding the problems associated with correlated residuals (Cole, Ciesla, & Steiger, 2007)[21].

In any case, there were no differences between models using the full list of items or the smaller set in terms of which model was preferred or regarding the significance of factor estimators and structural regression estimates. Additionally, it was observed that all pairs of latent variables either using all items or the smaller set, showed correlations above 0.9 (at $p<.001$). Therefore, the possibility that using a smaller set of items had any negative impact on the accuracy of the results or on the interpretation of these was fully dismissed.

For *trust, consequences* and *acceptance*, three items were kept to form a latent variable for each concept, whereas for *group-id*, two items were selected to represent *dominant-id* and *subordinate-id*, (i.e. those which referred to identification with *european-chileans* and *indigenous-chileans* respectively). These were included in the models as distinct observed variables.

All models were assessed using the maximum likelihood estimation with robust standard errors estimator (MLR in Mplus 6)[22] and their fit was assessed through various indices, i.e. chi-squared test, CFI, RMSEA, and SRMR. With these statistics, a base model was tested initially (i.e. a confirmatory factor analysis with bivariate correlations assumed between the three latent variables and the

[21] N.B. A correlated residual refers to covariance between items that remained unexplained by structural models. In this study, the number of items was reduced by removing those for which remaining covariance could be explained in terms of semantic similarities and conceptual equivalence to other items. For example, items i2 and i5 explored the perceived impact of hydro on the economy, one at the national and the other at the local level respectively, and both held a covariance which could not be accounted by a latent variable formed using all the *impact of hydro* items. Other examples include: items t2 and t3 which explored trust in national and foreign companies respectively; and items a2 and a3, both of which explored the acceptance of specific hydro projects. For each of these cases the first item shown in the questionnaire was kept (although no significant differences were found in the models if the other items were preferred).

[22] The MLR estimator is a conservative one, and is recommended for data that violates common assumptions (as it was the case for many items which showed skewness). In any case, using other estimators, such as maximum likelihood (ML), showed results in the same line of this analysis (e.g. with similar fit indices, and with the same models being statistically preferred).

two observed variables measuring identification), see Figure 6.4. This allowed the possibility to evaluate the discriminant validity of the concepts under study.

Having established an adequate measurement model, the remaining three competing models were examined, and were used to assess indirect effects (with bootstrapping[23], as recommended in Hayes, 2009). Finally, to identify which model was preferred; the significance of chi-squared differences was tested (using the procedures described by Satorra & Bentler, 2010).

6.4 Results

Fit indices for each of the four tested models are found in Table 6.1. These reveal that all the models considered have good indexes of fit to the data, i.e. CFI>.9, RMSEA<.05, SRMR<.05 (as suggested, by example, on Kline, 2011), plus all the chi-squared tests were found to be non-significant (at p>.05), meaning that none of the models implied significant distortion from the observed data.

Table 6.1 Fit statistics for competing structural models

Model	χ^2	*df*	CFI	RMSEA	SRMR
1. Base model	37.716	36	.998	.015	.030
2. Causal-chain	39.784	37	.996	.019	.031
3. Affect-heuristic	38.189	38	.998	.012	.032
4. Associationist	45.289	40	.993	.026	.039

Note: all chi-squared tests non-significant at p>.05

The base model is presented as follows to provide a notion of how the variables were bivariately correlated with each other. As well, the standardized estimates of the three theory-driven models are presented to explore the potential explanations that each has to offer, considering that at this stage, they all seemed plausible accounts of the variance in the data.

[23] All bootstrapping analyses were set at 5000 random sub-sampling draws and using the ML estimator.

6.4.1 Base model

Estimates for the latent factors of the base models are found in Table 6.2. These show adequate values to assume discriminant validity at this stage, since the model has good fit to the data and nearly all the items specified for a common factor are loaded to a high degree (near or above 0.7). The only exception is found for item i2 (national economy), showing a medium degree loading; however, this was still found to be significant.

Table 6.2 Item-estimates for latent variables in the base model

Term	B	Beta	SE	r^2
acceptance				
a1. in general	1.000	.704*	.041	.496*
a2. specific project 1	0.931*	.870*	.025	.757*
a4. project nearby	0.914*	.825*	.029	.68*
consequences				
c1. environment	1.000	.775*	.037	.601*
c2. economy	0.705*	.574*	.054	.330*
c3. wellbeing	1.056*	.777*	.037	.604*
trust				
t1. government	1.000	.714*	.050	.510*
t2. companies	1.000*	.755*	.046	.570*
t4. engineers	0.950*	.699*	.051	.447*

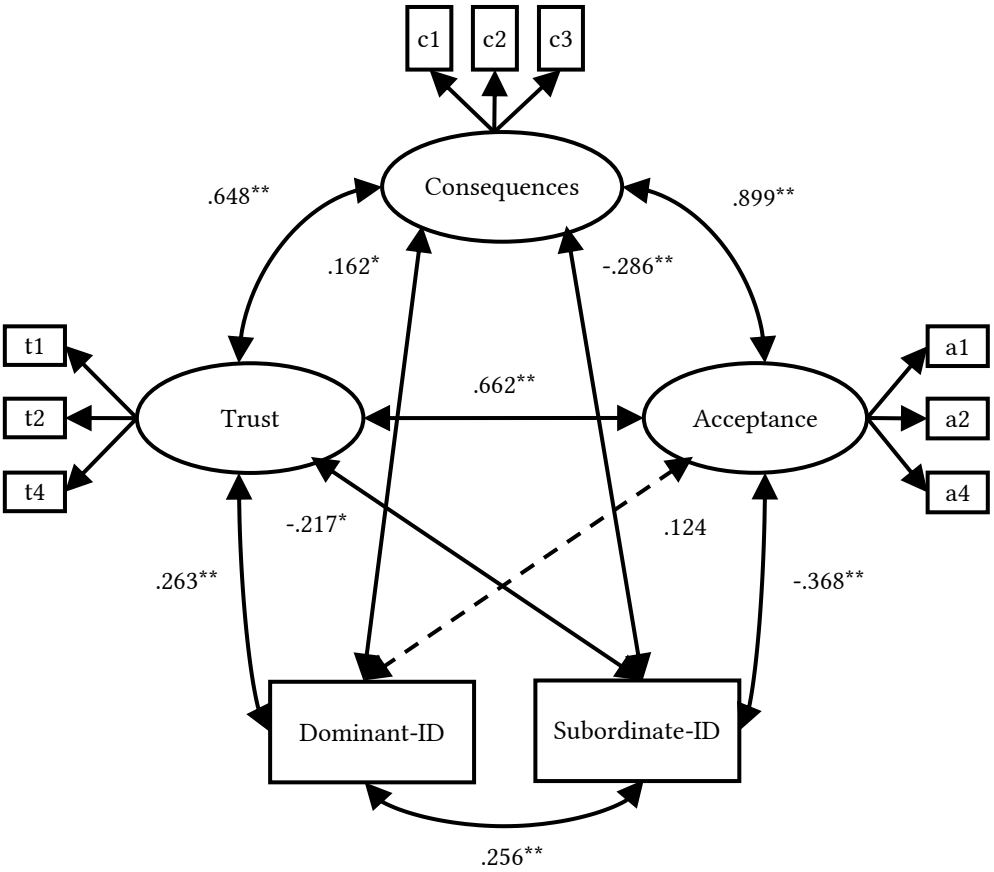
Note: as required by the standard analysis procedure, one unstandardized estimate was fixed at 1 for each latent variable. The remaining unstandardized and all standardized estimates and r^2 values were significant at $p \leq .001$.

Additionally, the r^2 values (all significant at $p \leq .001$) showed that the latent variables explained between ~33% and ~75% of the variance of each item; satisfactorily accounting for ~56% of the total variance in the data.

As shown in Figure 6.4[24], nearly all correlations between the key variables of the study were found to be significant at this stage (all at $p \leq .05$). This is consistent with the results of the correlational analysis presented in Chapter 4, and in line with what would be expected from a model with adequate convergent validity. The exception was a non-significant association between acceptance and *dominant-id* (which was also not found to be significantly associated in Chapter 4 until other variables had been controlled for in multiple linear regressions).

[24] N.B. As it is standard practice in diagramming structural equation models, in the figures of this Chapter, variables represented by rectangles refer to observed variables (here items); variables represented by ovals refer to unobserved/latent variables (defined by the shared variance between items); one-sided arrows represent regression lines, and their attached values refer to beta values; and two-sided arrows represent bivariate correlations, and their attached values refer to their standardized value. Additionally, unexplained variance (standard error) for each latent variable is displayed in the values attached on top of them in the three competing models.

Figure 6.4 Base model with standardized correlations estimates



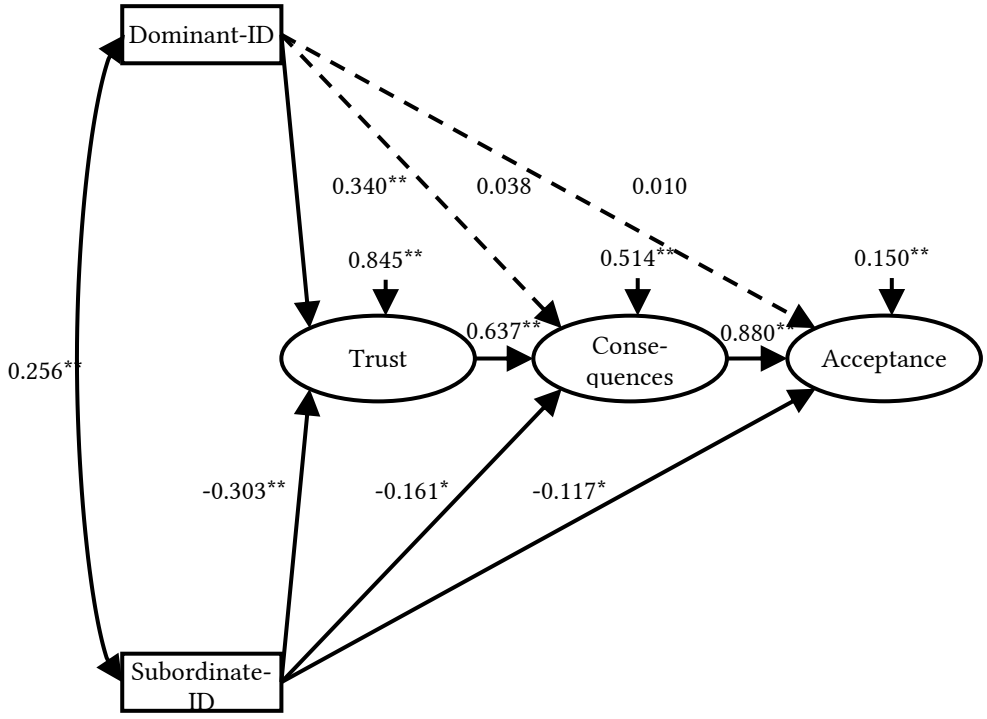
* $p \leq .05$, ** $p \leq .001$

It is worth noting that within the base model, the correlation estimate between consequences and acceptance was found to be particularly high (~0.9). For some methodologists this would reveal that discriminant validity could not be assumed between these concepts because of unacceptability high collinearity, and might be better explained by a common underlying construct (Kline, 2011). However, since this construct is represented as the *attitude* latent variable in two competing models (i.e. trust-heuristic and associationist models), and since the base model fit was adequate, it was deemed tolerable to keep these variables separated for their consideration in the causal-chain model.

6.4.2 Causal-chain model

This model represents a causal-chain of events, in which trust influences acceptance through an effect which is mediated by consequences (i.e. when people have higher *trust*, they enhance their perception of positive *consequences*, and only as a cause to this, they also develop higher *acceptance*). In this model each measured aspect is treated as a conceptually and statistically different variable, each one distinguishable from the other. The set of relationships represented by the model (Figure 6.5) reveals that each latent variable had significant error terms, *acceptance* having a small one (with only around 15% of the variance left unexplained), whereas *consequences* and *trust* show larger values of unexplained variance (~51% and 85% respectively).

Figure 6.5 Causal-chain model with standardized regression estimates



* $p \leq .05$, ** $p \leq .001$

As in the base model, the direct relationship observed between *consequences* and *acceptance* showed a significant value so high (.880 at $p \leq .001$) as to question whether they can be accurately considered to be measuring distinct concepts. The indirect effect of *trust* through *consequences* was found to

be large and significant (.560, $p \leq .001$). Therefore having tested a causal-chain model tested, the central aspects of this approach were found to be significant.

In relation to the distinct effects of identification with groups, the direct effect of *dominant-id* was found to be positive significant and medium-sized on trust, but not on the other latent variables. Thus, its only significant effect on *acceptance* was found to be indirect through the *dominant-id → trust → consequences → acceptance* path (.191, $p \leq .001$).

On the other hand, the direct effects of *subordinate-id* over the three latent variables were negative (and significant), ranging from medium to small-sized. Therefore, significant indirect effects on *acceptance* were found via the *subordinate-id → trust → consequences → acceptance* path (-.129), and through the *subordinate-id → consequences → acceptance* (-.107) path, with a total indirect effect of -.236, and an overall effect of -.325 (all at $p \leq .05$)

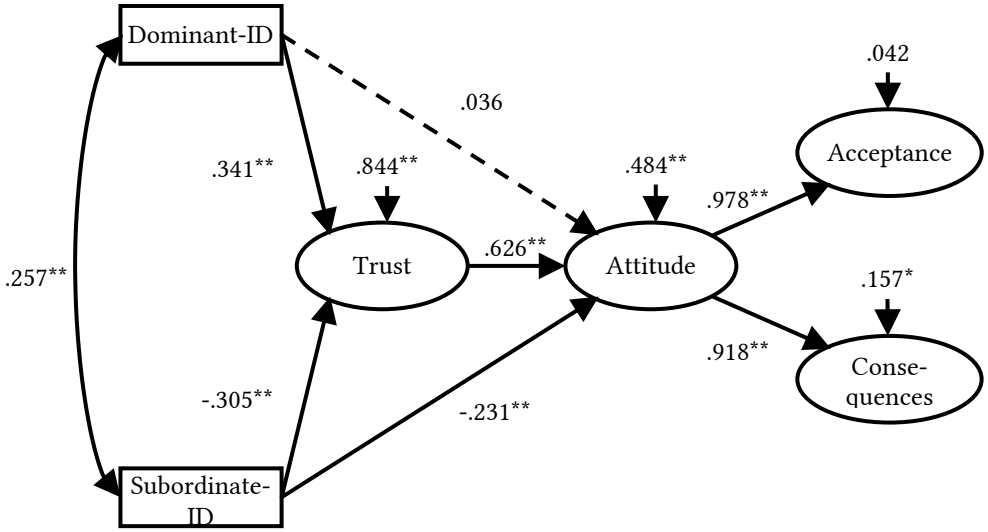
These results suggest that, if a causal-chain model operates in defining people's views, the influence of identification with dominant and subordinate groups are quite different. In this sense, *dominant-id* only influences *acceptance* through its influence on trust (in-group bias enhancement); whereas *subordinate-id* influences acceptance through trust (out-group bias detriment), through consequences (adoption of negative group beliefs), and also directly (adoption of negative prototypical norms). Therefore, the total effect of *subordinate-id* is larger than that of *dominant -id.*

6.4.3 Trust-heuristic model

This model represents a view in which *trust* has an impact on both *consequences* and *acceptance* together*;* because variance in both is better explained by a common attitudinal factor (i.e. *trust* is a used as a cue that directly influences how people *feel and think* about the technology). In the test for this model, *acceptance* and *consequences* were significantly explained by a common underlying second-order factor, here called *attitude*, with high factor loadings (above 0.9), see Figure 6.6. Therefore, error terms were non-significant for *acceptance*; and significant but small for *consequences* (only ~16% of variance left unexplained).

Trust showed a significant, large positive effect on *attitude* and significant indirect effects on *acceptance* (.612) and *consequences* (.574), both through *attitude* (at $p \leq .001$), and therefore, the central concept of the model is significantly observed. In this model, *trust* and *attitude* show large and significant error terms, showing that for each, ~84% and ~48% of the variance, respectively, remains unexplained.

Figure 6.6 Trust-heuristic model with standardized regression estimates



* $p \leq .05$, ** $p \leq .001$

Dominant-id showed a non-significant direct effect on attitude, but a significant direct effect on trust, allowing significant indirect effects on acceptance (.244) and consequences (.229) through the *dominant-id → trust → attitude → acceptance* and through the *dominant-id → trust → attitude → consequences* paths respectively (all at $p \leq .01$).

On the other hand, subordinate *group-id* showed a significant direct effect on attitude, through which indirect effects were found significant on *acceptance* (-.226) and *consequences* (-.212), through the *subordinate-id → attitude → acceptance* and through the *subordinate-id → attitude → consequences* paths respectively. As well, the same variable showed a direct effect on *trust*, and therefore displayed additional indirect effects on *acceptance* (-.187) and on *consequences* (-.175), through the *subordinate group-id → trust → attitude → acceptance and* through the

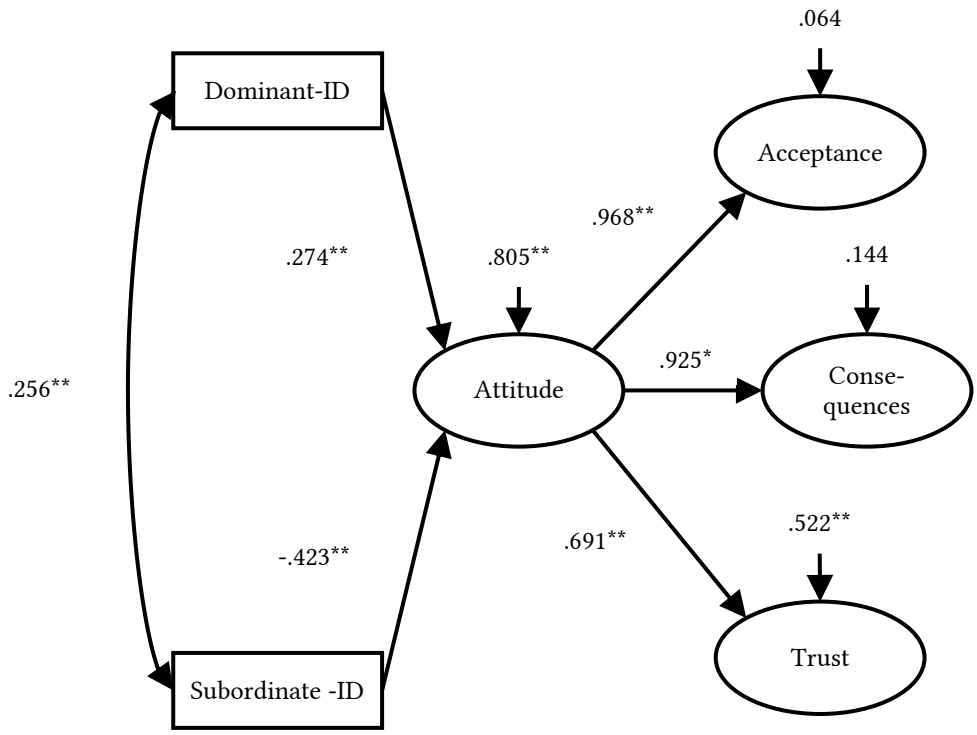
subordinate group-id→*trust*→*attitude*→*consequences* paths respectively. In sum, the overall effects of *subordinate-id* were found to be of -.412 on *acceptance* and of -.387 on *consequences* (all at $p \leq .01$).

As in the test for the previous model, if a trust-heuristic model is operating, the effects of *group-ids* are also different, i.e. *dominant-id* only has an effect through *trust* (in-group bias enhancement), while *subordinate-id* has dual effects, i.e. through *trust* (out-group bias detriment) and directly on *attitudes* (e.g. through adoption of prototypical norms).

6.4.4 Associationist model

This model represents a view where *acceptance, consequences* and *trust* are only indicators of how people feel about the technology. In the assessment of this model, *acceptance*, *consequences* and *trust* were significantly explained by a common underlying second-order factor, here referred to as *attitude*, with high factor loadings (all around or above .7) as expected in this approach (see Figure 6.7). However, *trust* was less well explained by *attitude*, as it had a significant error term, whereas the remaining variables composing the factor showed non-significant error terms. This indicates that for *acceptance* and *consequences* nearly all the variance was explained by *attitude*, whereas for trust only around ~48% of variance was explained. In this model, around 80% of the *attitude* variable remained unexplained.

Figure 6.7 Associationist model with standardized regression estimates



* $p \leq .05$, ** $p \leq .001$

Identification with both subordinate and dominant groups showed significant direct effects on attitude and significant indirect effects on *acceptance, consequences and trust*, via *attitude* (all at $p \leq .01$); positively for *dominant-id* (.265, .254 and .189 respectively), and negatively for *subordinate-id* (-.409, -.391 and -.292 respectively). Therefore, if an associationist model is in operation *acceptance, impact* and *trust* would only be explained as the result of identification with groups (e.g. through adoption of prototypical norms or shared values).

6.4.5 Model comparisons

By comparing the fit indices (i.e. smaller chi-squared, RMSEA and SMRS statistics and higher CFI) and the chi-squared differences[25] of the models (Asparouhov & Muthén, 2010; Bentler & Satorra, 2010; Satorra & Bentler, 2010), it was possible to assess which models described the data better.

In this sense, it was found that the three proposed theoretical models significantly outperformed the base model (i.e. causal-chain, $\Delta\chi^2(1)=2.068$, $p=.150$; trust-heuristic, $\Delta\chi^2(2)=1.473$; $p=.479$; and associationist, $\Delta\chi^2(4)=7.573$, $p=.109$). Additionally; the causal-chain model was outperformed significantly by both the trust-heuristic, $\Delta\chi^2(1)=0.140$, $p=.198$, and associationist models, $\Delta\chi^2(3)=5.505$, $p=.138$. Finally, the comparison between the trust-heuristic and associationist models revealed that the trust-heuristic model had the better fit, $\Delta\chi^2(2)=6.100$, $p=.047$, thus more adequately described the variance on the data, So, on statistical grounds, the trust-heuristic model should be considered as the preferred model.

6.5 Discussion

6.5.1 Preferring a model

A first noticeable finding to be highlighted is that all models, ranging from the total absence of theory (i.e. the base model with all variables correlated, the least parsimonious one, with more assumptions and less degrees of freedom) to the associationist model (the most parsimonious model, with the least assumptions and more degrees of freedom) were found to exhibit not just good, but what could be considered excellent fit indices (Hu & Bentler, 1999). This is not a problem within the current research, as this simply illustrates that all the competing models are plausible explanations for what is really happening in the

[25] N.B. Given that the models are nested, the test for differences between chi-squared estimations examines whether the less parsimonious model (that with fewer degrees of freedom) constitutes a significant improvement on explaining variance on the data (i.e. if the test for differences is found to be non-significant, the model with more degrees of freedom should be preferred; if the test for differences is found to be significant, the model with fewer degrees of freedom should be preferred).

data. Importantly, the comparisons of different theoretical models allowed to identify, which explanation of the relationships between the variables was statistically superior.

The process described within this chapter (i.e., that of testing competing theoretical models), addresses an important methodological point. As previously commented, researchers often only test the fit of their favoured theoretical models to the data they collect and, hence, fail to test other plausible theoretical alternatives. In this case, for example, if a researcher had defined *a priori* that only the causal-chain model would be tested against the base model, he probably would have interpreted results with extreme satisfaction, and perhaps simply concluding that the causal-chain model provides the best explanation for the data. By doing that however, he would have missed the fact that, at least in this case, the trust-heuristic model does provide a statistically better account.

Another common practice that would be dangerous in this respect would have been making modifications to the model that are not meaningful for the theoretical approach. For example, adding a causal path between trust and acceptance in a causal-chain model might improve the fit to the data (in fact reaching statistical equivalence to competing models that here were found to perform better), but such path it is not theoretically meaningful within the causal-chain approach. It is here considered that this would not represent the central propositions of the causal-model theoretical view in a comparative assessment, and would unjustly overlap with the assumptions (or lack of them) that are central to competing models. Focusing on only one causal explanatory approach to these issues might lead to the design of inadequate models, and thus to inadequately concluding that certain perspectives should be preferred.

On these grounds, versions of models were developed and tested so that that provided completely different theoretical integrative accounts. Here it was found that neither the most complicated model, nor the simplest one gave the best accounts for the data variance, but instead, an intermediate approach (i.e. the trust heuristic model), seemed to be the better alternative.

6.5.2 Identification with groups

In all the models *subordinate-id* had a direct effect on *acceptance* or *attitude*, whereas the same did not apply for *dominant-id*. In this sense, it might be the case that there is a group-norm effect only for the self-identified members of the subordinate groups (or people who identify with their plight). This might be the case because the issues of hydro seem to be a topic of more importance for subordinate groups, since they have experienced the negative consequences of it in the past, so they might have developed strong anti-hydro norms (see Chapter 1).

On the other hand, for both types of *group-id*, there were significant indirect effects through trust, revealing evidence in line with the intergroup biases on trust (Brewer, 1979, 2008; Tanis & Postmes, 2005). In this sense, if people see themselves as being part of/sympathising with a particular group, that leads to greater trust in the group, and therefore, a more likely acceptance of the position being advocated by the group.

6.5.3 Causality and equivalent models

Although the use of structural models is useful for comparing which theoretical approaches seem more plausible within certain datasets, in this case, good indices of model-fit by no means prove that the causal directions assumed in the models are actually the most adequate account of the most prominent processes involved in relation to their acceptance of hydro (or any other model being tested).

In fact, as commented in Chapter 1, each structural model has alternative explanations which are statistically equivalent but conceptually different. For example, the relationships of variables within the models can even be reversed by changing the direction of the drawn arrows. In this sense, equivalent model-fit indices can be found for reversed directional paths. For instance, in an inverse causal-chain model, *acceptance* would predict *consequences*, and *consequences* would predict *trust*; and *identification with groups* would be predicted by *trust*, *consequences* and *acceptance*. Or, in an inverse-trust-heuristic model, *identification with groups* would be a outcome of *trust*, while trust would be a result to *attitudes*.

However, while these possible alternative descriptions might be comparable on statistical grounds, such models are not supported by previous empirical work and are inconsistent with psychological theory. For example, when considering an inverse trust-heuristic model, although trust as an outcome of attitudes is a notion expressed in the literature (represented through the associationist model here), an effect of *trust* on *group-ids* would be less supported, because is not a common theme in the literature. Instead there is vast evidence of experimental research showing causal effects of social identities over trust (Brewer, 1979; Hewstone et al., 2002). Moreover, people's identification with groups is likely to be stable and founded on a basis of a wider set of experiences (Hogg & Abrams, 1998) beyond the mere trust held in stakeholders of electricity generation. Since in an inverse model, some of the paths are less theoretically meaningful, the whole alternative model is rendered of lower value, and therefore can be dismissed.

In this sense, adding complexity to the original causal, trust-heuristic and associationist models by extending their network of variables, contributed not only to gain degrees of freedom to compare models, but also to clarify what models provide explanations that seem more theoretically plausible.

6.6 Conclusions

This chapter investigated three competing integrative theoretical models through the use of SEM. All models showed good indices of fit; however, the *trust-heuristic* model was statistically preferred. This model suggests that people are influenced by their levels of *trust* in stakeholders when defining their *attitudes* (how they feel and think) about hydro. Moreover, there was only indirect influence of *dominant-id* on these attitudes (via trust), whereas there was direct and indirect (via trust) influence of *subordinate-id* on attitudes. This suggests that for measures of dominant-id, there is an effect of an in-group bias enhancement on trust; whereas for the subordinate group, there is an out-group bias detriment on trust, but also a direct effect (which could potentially be explained by the adoption of prototypical group norms and values).

7 General discussion

7.1 Summary

The research aims that led this thesis and the main findings that emerged from the empirical studies are reviewed and contrasted with the literature review. Additionally, practical implications for policy-making, limitations of the research, and guidelines for future research are presented.

7.2 Aims of the thesis

The work of this thesis had two overlapping purposes: an applied one, and a theoretical one. The first referred to gaining a better understanding about the controversies that surround the development of hydro in Chile, and the latter referred to extending socio-psychological theory about how people form their views about industrial projects.

After an acknowledgment of the applied context of the research (Chapter 1), and a literature review of research into the acceptance of industrial technologies and related issues (Chapter 2), three variables were identified to be of interest as potential explanations for the levels of public acceptance of hydro. These were: perceived *consequences* of the technology, *trust* in stakeholders, and *group-identification* with dominant and subordinate national groups. The purposes of the thesis were operationalized through the four following research questions/aims and their corresponding methodological approaches:

- Firstly, clarifying whether there were different publicly available prototypical norms in relation to hydro across Chilean groups. This aim was approached through a thematic analysis of Chilean newspaper articles in Chapter 3.
- Secondly, to assess the existence of relationships between the key variables of the study (i.e. *acceptance, consequences, trust, and group-ids*). This was tackled through the analysis of bivariate correlations and multiple linear regressions in Chapter 4.

- Thirdly, to further examine the nature of the relationships between the variables of interest, particularly between *trust* and *group-ids*. For this, the approaches of the two previous chapters were integrated in an experimental study, described in Chapter 5.
- Finally, to establish comprehensive theoretical models that could account for the set of relationships between variables described through the previous chapters. This aim was addressed through the evaluation of competing structural equation models in Chapter 6.

7.3 Summary of findings

Through the empirical studies presented in Chapters 3 to 6, evidence has been raised to address the aims of this thesis. This evidence is synthesized and contrasted with the literature review in the following subsections; initially segmented by study, and is later analysed in an integrated overview.

7.3.1 Prototypical group norms in newspapers

The main finding for the thematic analysis of Chilean newsprint articles presented in Chapter 3 is that the coverage of energy issues and particularly hydro varied across different types of newspapers (i.e. subordinate-source, in-between source, and dominant-source) in terms of the valence attached to technologies, and in terms of the stakeholders whose opinions were reported.

Specifically, it was found that the dominant-source newspaper (*El Mercurio*) published more reports of a pro-hydro nature than other sources, and that it also covered more the views of dominant stakeholders (i.e. the government, energy companies). In contrast, it was found that the subordinate-source (*El Ciudadano* newspaper) reported more anti-hydro views, and published more articles that looked at the opinions of subordinate stakeholders (i.e. residents near to projects, environmentalists, indigenous groups). Finally, an in-between-source newspaper (*La Nación*) reported an equal number of pro-hydro and anti-hydro views, but published a proportionally similar number of dominant group views as were published in the dominant-source.

In this sense, considering that mass media (e.g. newspapers) is commonly used by groups to promote their views and to educate group members about

their prototypical norms (cf. Hogg & Reid, 2006; Pidgeon et al., 2003), it can be inferred that the readership of *El Mercurio* (i.e. members and sympathisers of the dominant group), would be expected to hold more pro-hydro views, and be more familiar with the arguments expressed by dominant stakeholders; whereas those following *El Ciudadano* (i.e. members and sympathisers of subordinate groups) would have more anti-hydro views and be more familiar with the views of subordinate stakeholders. Finally, followers of La Nación (probably the *Concertación* supporters), would be *in-between,* i.e. would be expected to hold intermediate views between both groups.

Moreover, newspapers varied in terms of the consequences that they focused on, so that the in-between-source and the dominant-source focused more on economic *consequences*, in comparison to the subordinate-source, which focused more on environmental and societal *consequences*. Additionally, a look into articles regarding hydro showed that environmental and societal *consequences* were often linked to an anti-hydro valence, whereas reports of economic *consequences* were more commonly pro-hydro.

The emphasis of groups on different *consequences* might explain, in part, the source of some of the controversies around hydro. Since groups are norm and value-laden (Tajfel, 1982), identification with groups that hold different norms and values could account for why people (as newspapers) might focus more on certain aspects as positive or negative.

Taken together, these findings suggest that the dominant and subordinate groups have strong differences in terms of the norms and values that they hold in relation to the decisions regarding energy issues, and moreover, that they engage in intergroup biases in terms of covering the views of diverse stakeholders. Therefore it appears that hydro, as it would be perceived by common citizens, is a publicly discussed issue which is not only controversial because of its environmental consequences, but also in relation to intergroup phenomena rooted in political and historical conflicts (see Chapter 1).

In this respect, building upon Chilean history, it is speculated that the dominant group (and those identified with it) might give more importance to

economic and technical aspects of hydro development, and exhibiting *embeddedness and hierarchy values* (e.g. they supported either an authoritarian technocratic dictatorship, or the *Concertación*, which followed its rules); whereas those identified with subordinate groups would be more concerned with societal, human and environmental aspects, and exhibit *egalitarianism and harmony values* (e.g. consider the Pehuenche traditional lifestyle and their links to nature, or the remaining *Unidad Popular* supporters and their concerns with social equity).

7.3.2 Assessment of predictors

In the correlational assessment presented in Chapter 4, the variables of interest identified through the literature review (*consequences, trust, group-ids*) were all found to be significantly correlated with the *acceptance* of hydro in the directions that were hypothesized (i.e. more positive perceived *consequences*, higher *trust*, and higher *dominant group-id* were correlated with higher levels of *acceptance* of hydro, whereas those with higher *subordinate group-id* showed lower levels of *acceptance*).

Consequences

To this effect, regarding perceived *consequences* of hydro, *environmental* (*global* and *local*) and *societal* aspects (*national wellbeing* and *local rights*) were found to be significant and positive predictors of *acceptance*, whereas none of the *economic* aspects were found to be significant predictors in the same regression.

As suggested by the expectancy-value models of attitudes (Fishbein & Ajzen, 1972; Thomas et al., 1980), beliefs about these positive *consequences* of hydro were related to higher levels of acceptance, and conversely, perceptions of negative *consequences* were correlated with lower acceptance (Sjöberg, 2000).

It was noticed that nearly all the items within the consequences variable were found to be highly correlated with each other, thus forming one single factor in an exploratory factor analysis, and altogether together they exhibited a high Cronbach's alpha. The latter is desirable for scales if every item is meant to measure the very same aspect. However, since they covered a wide range of

consequences (environmental, economic and societal), it is proposed that this level of covariance might reveal an underlying common latent variable that could explain this whole set of responses. It is suggested that this latent variable would refer to *attitudes* towards hydro, that would act through an *affect-heuristic* (Finucane et al., 2000; Slovic et al., 2002) when people are asked to consider various potential *consequences* of hydro (see further examination of these ideas in the analyses of Chapter 6).

More specifically, people seem to have a sense of whether the development of hydro is desirable or not, and when they are asked to evaluate this technology across varied criteria, for most items, they respond relying in the feelings or intuitions that are associated to the views they already had (Eiser et al., 2010).

Trust

Regarding *trust* in stakeholders, the *government* and *energy companies* were found to be significant positive predictors in a common regression. As suggested by Slovic (1996), those with less trust in institutions are more likely to oppose projects (and vice versa).

At this stage of analysis, this could reflect that *trust* in relevant stakeholders might enhance people's beliefs about a technology, because it might enable the expectation that the technology will be developed with adequate expertise (e.g. good technical decisions, diminishing unnecessary risks) and/or with good intentions (e.g. benefiting the public, and without causing harm to people), and therefore enhance the acceptability of the technology, as in a causal-chain (Bronfman et al., 2012; Siegrist, 2000).

There is also an alternative explanation that the report of *trust* could also be the mere outcome of previously available *attitudes* towards hydro (cf. Eiser et al., 2002). Nevertheless, for this research such notion might be discarded, since the questionnaire focused on a wide range of electricity generation sources and so, when *trust* was measured, items did not refer specifically to hydro, and therefore, participants would not necessarily base their responses on their views of hydro solely, but considering the wider context of electricity generation (i.e. participants were not asked directly whether they trusted hydro

developers, but electricity generation companies in general)[26] (however, see Chapter 6 for another approach to this view).

Group-ids

As mentioned, it was found that there were positive relationships of *dominant group-ids* with *acceptance* of hydro; in particular measures of identification with *most-chileans* (the majority) and with *european-chileans*. The opposite relationships were found for *subordinate-group-ids*, i.e. identification with *indigenous-groups*.

These relationships are here interpreted as an outcome of the effect of the social influence of *group-id* on *attitudes* (Cooper et al., 2001; Smith & Hogg, 2008) in line with the social identity theory approach. More specifically, this refers to the adoption of prototypical group norms by those individuals highly identified with groups (Turner et al., 1987), i.e. pro-hydro for dominant-*group-id*, and anti-hydro for subordinate-*group-id* (Mairal, 2004, also see Chapters 1 and 3); and to a group-bias effect on *trust* in stakeholders, as the result of shared (or not) *group-ids* (Brewer, 1979, 2008), so that, for example, those with a high *dominant group-id*, could end up having higher levels of trust in the government (of which nearly all the members in high positions have been historically *european-chileans*), by perceiving them to be in the same group as themselves (thus inferring similar values), and accepting and validating their *pro-hydro* views.

It is worth noting that the groups on which this research focused are not mere categorizations devoid of historical context. For example, it is not hard to understand the opposition of Mapuche groups (and sympathisers) to hydro projects (and the related distrust in companies and the government) when they are about to take place in the lands where they live. Particularly when acknowledging the history of conflicts for land held with Europeans, and non-

[26] N.B. In this respect it is noted that previous research might have enabled responses biases in this respect, by wording every item with reference to the technology under study (Bronfman et al., 2012; Poortinga & Pidgeon, 2005; Siegrist et al., 2000; Stampfli et al., 2010).

indigenous-Chileans; and how all these groups have discriminated against them systematically through history (Comisión Verdad Histórica y Nuevo Trato con los Pueblos Indígenas, 2008).

In any case, the influence that groups might have would be explained in terms of the level of *identification* or attachment that individuals feel to such groups; and not to categorisations *per se*. For example, it was observed that *ethnicity* did not significantly predict *acceptance,* so that there were no differences between those who classified themselves as *european-chileans* or *indigenous-chileans* (instead the significant differences were found between those who reported a level of identification with these groups).

In this sense, in this research samples, it was found that self-described *european-chileans* (in terms of *ethnicity*) could feel identified with *european-chileans*, *indigenous-chileans*, or both, or none. As well, some Mapuche people who despite classifying themselves as *indigenous* (in terms of *ethnicity*), do not feel identified with that such group, and do not adopt the prototypical anti-hydro norms. Instead, they might adopt those of other groups they actually identify with (Hogg & Abrams, 1998).

7.3.3 Further look into trust and group-ids

As found in previous research (White & Eiser, 2005; White et al., 2003), the results of Chapter 5 showed numerous biases regarding how people decide how credible a message is. In this case, participants showed tendencies for a negative bias (i.e. attributing more credibility to texts that portrayed the issue of hydro development negatively), and for a self-confirmatory bias (reporting levels of trust that matched with their previously reported attitudes respectively). These findings suggest that the sample responded using similar biases that people use in other thematic and geographical contexts when encountering other controversial topics (White & Eiser, 2005; White et al., 2003).

Moreover, there were also effects on *text-credibility* associated to the *text-source* in interaction with *dominant-group-id,* so that those with high identification with the dominant group showed more trust in the text when the source was portrayed to be the dominant-source, and less trust when the source was portrayed to be the subordinate-source; and vice versa for those

with *low dominant-group-id*. This finding can be characterised as a form of intergroup bias on trust (Brewer, 1979, 2008). Overall, it was found that when issues of hydro are under discussion, to define how credible some information is, it mattered to participants what the source of the message was and whether it was perceived to be an in-group or an out-group source (cf. Hovland & Weiss, 1951; Smith, De Houwer, & Nosek, 2013).

It is worth making the distinction that this effect was only present for the *dominant-id*, and not for the *subordinate-id*. This could be the result of the choice of subordinate newspaper, which was perhaps not considered to be representative enough of subordinate people. Although if this was the case probably there is not such a formal source in Chile (and actually, it might be a characteristic of the group not having an *official* voice). An alternative explanation is that the differences in effects of group-ids could reveal that the nature of both *group-ids* relationships to *attitudes* are not the same. That is, *dominant-group-id* has an effect on attitudes through trust (e.g. they end up supporting hydro because they rely in public institutions doing well and making good decisions), and *subordinate-group-id* has a direct effect on atttitudes, which could be speculated to be based on group norms and values (e.g. group members have faced directly the negative consequences of hydro in the past, and/or they have strong environmental concerns, so they have a clear anti-hydro stance).

Additionally, it was observed that *post-condition attitudes* towards hydro were affected by the text-valence. That is, those in the pro-hydro condition showed less negative attitudes than those in the anti-hydro condition. Nevertheless, the differences were not substantial enough to change the general valence of these attitudes, which remained negative on average for all conditions. This might be the result of a numerical majority of people having previously available negative attitudes towards hydro, which were found to be resistant to change.

Finally, *post-condition-attitudes* were also predicted by an interaction between *text-credibility* and *text-valence*. That is, higher *text-credibility* of pro-hydro vignettes was associated with more positive *post-condition attitudes* to hydro. However, an inverse effect was not observed for text-credibility of anti-

hydro vignettes. It can be speculated that *attitudes* were already too negative and prominent as to make them *more* negative (see Chapter 1).

These findings naturally relate to theories on attitude change and persuasion, so that *who* said *what* to *whom* (here *text-source, text-valence* and *group-id*) had an impact on trustworthiness (text-credibility) and post-condition-attitudes. For example, building upon the Elaboration Likelihood Model of Persuasion (Petty & Cacioppo, 1986), it could be argued that the intergroup bias on *trust* could have affected post-condition-attitudes either as a *cue*, enabling fast associative responses (i.e. trusting the source, and without much resistance, accepting the message), or by enhancing the levels of attention and effort spent in responding (i.e. trusting the source, and therefore considering more carefully their arguments). The former alternative appears to be more likely in this setting because of the results found of the assessment of competing structural models (see Chapter 6).

7.3.4 Comprehensive models

Three competing structural models were proposed to comprehensively account for the relationships between the variables of interest in this research in Chapter 6: (1) a causal-chain trust model (cf. Siegrist, 1999, 2000); (2) a trust-heuristic model (cf. Finucane et al., 2000; Slovic et al., 2002; Slovic, 1993); and (3) an associationist model of trust (cf. Eiser et al., 2002).

Through an assessment of structural equation models, it was found that the statistically preferred model was the trust-heuristic model, which was proposed in this thesis and builds upon the work of Slovic and colleagues (Slovic et al., 2002; Slovic, 1993). This model constitutes an intermediate point between the causal-chain (Siegrist, 1999) and the associationist models of trust (Eiser et al., 2002).

This finding suggests that the *acceptance* of hydro and how its *consequences* are perceived, have an underlying common factor that largely explains them together. This would mean that instead of constituting two different constructs, as in a causal-chain model (Siegrist, 1999), *acceptance* and *consequences* form together a single variable, which were considered to be a measurement of *attitudes* towards the technology. This is similar to an affect-

heuristic (Slovic et al., 2002) or associationist approach to the understanding of the structure of attitudes (Fazio, 2007).

This preferred model proposes that when people responded to the surveys, they were not necessarily thinking thoroughly about the relative benefits and detriments of hydro, but rather basing their responses on feelings largely influenced by the perceived trustworthiness of stakeholders (Slovic, 1993). It is worth noting that suggesting that the public is being reliant on a trust-heuristic (or affect-heuristic) by no means implies that their motives are unfounded, irrational, or nonsensical. Instead, their views are likely to be previously existent and founded in a long history of interactions that have led them to trust or distrust in these stakeholders.

In this sense, the existing historical negativity (e.g. violations of human rights) sets up that an scenario where consideration of the economic benefits of the technology either do not occur, or if it does, it does not really hold much weight in shaping people's attitudes. In this context, the emphasis that Sjöberg (2008) makes on *antagonism* as a predictor for *demanding mitigation* of technologies and industrial developments makes much sense. For some, the dominant outgroup can be perceived to threaten the very existance of their culture and identity (e.g. how can *pehuenches* be *pehuenches* without the *pehuén*?, see Chapter 1), and therefore would be quite expected for them to perceive companies and stakeholders alike as *enemies* with far too different (and conflicting) goals, and therefore opposing whatever they propose without much need for prior examination of what they might be proposing each time.

In contrast, those who have perceived the benefits of previous projects and who do not relate to the minorities who have suffered from the consequences of hydro in the past, but share an identity with the *dominant-groups*, might have an elevated confidence in the skills and values of those in power, and could feel that they know *what* they are doing and *how* they are doing it (calculative trust), and *why* they are doing it (relational trust), and therefore conclude that it must be a good idea.

7.4 Implications

The implications for public policy and development strategies relate to enabling substantial changes in the Chilean system, which could allow trust in stakeholders to be enhanced on the basis of participation, honesty and good decision making.

In this respect, the government and companies should follow (or consider at least) the recommendations of international agencies. The IEA (2009) has made strong comments on how Chile's security of supply is at risk if proper democratic national consultations are not made for large scale hydro. So accordingly, a first recommendation would be acknowledging the need for public participation, and enabling channels for such processes. Since decisions have been historically made top-down in these respects, there is always the risk of running consultations after the decisions have already been made, and just to "show that they care" while in reality there has been no real participation (the same applies for local consultation).

In this same respect, the international guidelines for hydro development outlined by the WCD (2002) put much emphasis on the many societal consequences that should be addressed or avoided when developing large-scale projects, much of which have been ignored until now in Chile. Moreover, Chilean laws should be respected for developing hydro. This is a lamentable comment to make, but it has so repeatedly been ignored (or approached through loopholes, see Chapter 1), that this needs mentioning.

A disagreement with Bronfman et al. (2012) should also be noted, who concluded that the acceptance of technologies could be enhanced by better informing the population about the benefits. Although some persuasion effects were observed through this method in the experimental study, these effects were very small (and probably not very long-lasting). If people have strong negative attitudes about hydro, and for many people these are founded upon historical distrust, it can be foreseen that people would not be supportive of hydro even if there were projects without almost any considerable negative consequences to the population or the environment (it is not suggested that such a project could exist), because at the core of the disagreement is the fact

that those who are developing the projects are highly distrusted for strong reasons. And moreover, if those who are distrusted are perceived to be so supportive of hydro, it may have the opposite effect from that intended, as a result of out-group derogation (e.g. if El Mercurio supports something, that might sparkle the opposite views on its antagonists).

Therefore, the recommendation would be that, instead of attempting to enhance the perception of positive consequences of hydro, the relevant stakeholders should focus their efforts on building trust, which might prove to be a hard (if possible) task (Slovic, 1993). In this sense, some first steps to be considered by dominant stakeholders would be recognising the errors from the past (e.g. form a commission to investigate the violations of human rights in dam-siting processes), amend things which can be amended (e.g. compensation of the Pehuenche people); and recognising the value of legislation and social protest in democratic societies, as opposed of pushing governments and citizens to comply with mega-projects without adequate consultation.

A perhaps more realistic recommendation for public policy is facilitating the de-monopolisation of the Chilean electricity generation market, and to incentivise the incorporation of new companies (as suggested by the IEA, 2009), that are willing to properly engage with democratic processes.

7.5 Limitations & future research

7.5.1 Inferring causality and applicability of models

Models of trust were discussed and tested, providing an assessment as it had not been done before in published studies. However, the cross-sectional nature of much of the data used in these studies, does not disprove alternative models with regression arrows in inverse directions, and neither provides any certainty on whether these findings would extend to other technologies and similar issues in other contexts.

Developing longitudinal and experimental methods for these types of studies that are integrated with SEM, seem to be a required following step to strengthen (or rectify) the propositions of this thesis. Further studies should extend the critical approach to structural equation modelling to other related

areas (i.e. other technologies and hazards), contexts (i.e. other countries and target-groups), and using diverse sets of items and data collection techniques (i.e. longitudinal, experimental approaches), with similar statistical analyses.

Future studies should attempt to bring more clarity to establish the processes which define people's views regarding many technologies or hazards by using the comprehensive models that have been outlined (or adequate strict adaptations). In particular, models developed tested in this thesis should be used to analyse the data of previous studies (e.g. Bronfman et al., 2012; Eiser et al., 2002; Poortinga & Pidgeon, 2005; Siegrist, 2000), to re-examine their results and conclusions, so that trust-heuristic and associationist models are adequately considered.

7.5.2 Sampling issues

The scope of the conclusions of this thesis is restricted by the use of convenience samples. Therefore, similar analyses should be performed using data from representative national or local samples from future surveys, and also using datasets from previous studies in other applied contexts and geographical settings.

Nevertheless, it is anticipated that analyses of data from representative samples of the Chilean context would not fundamentally differ from the findings of this thesis, since this research's data matches very closely those of public opinion surveys (i.e. Latinobarómetro, Ipsos) and of other studies (Bronfman et al., 2012) in terms of proportion of support/opposition towards electricity generation sources and in terms of the strength of correlations between key research variables (i.e. *trust, consequences, acceptance*).

7.5.3 Adoption of norms and shared values

Regarding the social influence of *group-id*s, this thesis has commented upon the adoption of prototypical norms and influence of shared values within groups, however this research has not directly analysed whether these aspects actually influenced people's views. In this sense, these explanations were speculated to explain the direct effects of group-ids, and these should be examined directly in future studies.

In this respect, for example, it has been suggested that environmentalists have different set of values to the rest of the population (Toledo & Aravena, 2009); or that those who support certain controversial projects are more concerned with economic issues, while those who oppose have more interest in societal aspects (van der Pligt, van der Linden, & Ester, 1982). More specifically, the conflicts of many Latin-American indigenous people have been framed as a conflict of land-based values against the neoliberal ideology (Rice, 2010).

The effect of *group-id*s should be explored in terms of contrasting value systems, such as *egalitarianism/harmony* vs. *embeddedness/hierarchy*; or *egoistic* vs. *altruistic* values, as for example discussed for nuclear power in De Groot, Steg, & Poortinga (2012)[27]. In particular, it would be expected that the relationships between *group-id*s and acceptance would be mediated by these types of values.

7.6 Conclusions

Through a number of studies aimed to gain a better understanding about the nature of public views about the development of hydro in Chile, it has been found evidence supporting the idea that people's reported levels of acceptance (or support/opposition) of hydro projects might be explained not only in terms of the perceived consequences of hydro *per se*, but also in terms of the levels of trust they hold towards relevant stakeholders, and in terms of their identification with dominant and subordinate groups.

To this effect, strong relationships were found between the perceived consequences of hydro and the acceptance of it (of which environmental and societal were prominently more predictive). Nevertheless, the high collinearity between the two suggested that it was unlikely that people were making thorough considerations of diverse types of consequences on their own, but

[27] N.B. The cited study, and other similar approaches suffer the same type of self-confirmation bias found in studies related to the role of trust in risk perception that were discussed in Chapter 6 when using structural models. It is considered that the discussion of structural models in Chapter 6 would also be beneficial for exploring the role of values and other variables in risk perception and related research.

instead were being led by their already available attitudes to hydro to judge most of the criteria. This is not to say that the perceived consequences are not relevant for forming people's views at some point, but instead suggests that people's consideration of varied consequences is likely to be influenced by how they already feel about the technology (Slovic et al., 2002).

In this sense, these feelings could be explained in terms of the levels of trust, or distrust that people hold in stakeholders (Slovic, 1993). That is, people might be reliant on a trust-heuristic to make their assessments of hydro, so that if they trust more in the institutions that propose its development, they tend to perceive it as a desirable thing, since those who propose it are perceived as well-intentioned or skilled enough to make adequate decisions (or vice versa).

Furthermore, it was found that people who identified with the dominant and national majorities (i.e. most-chileans, european-chileans), tended to trust more in dominant stakeholders (government, companies) and communicators. The enhanced levels of trust can be considered to be a result of an in-group bias, i.e. they are perceived more trustable because they are perceived to be sharing a common group identity (Brewer, 1979, 2008; Tanis & Postmes, 2005); and thus, similar values are inferred.

On the other hand, those who identified with subordinate minorities, in this case national ethnic-minorities (e.g. with the Mapuche people), reported lower levels of acceptance of hydro. This is here interpreted in terms of the precedents of how hydro developments have negatively affected indigenous communities in the past, which might have led to the development of and distrust in stakeholders and to prototypical anti-hydro norms typically found in subordinate anti-establishment media, and which are generally adopted by those who strongly identify with these groups (J. R. Smith & Hogg, 2008; Turner et al., 1987).

Overall, the central tenet of this thesis is that the process of defining attitudes towards certain technologies is not the same for all individuals, and it is not only based on how people perceive *consequences per se*; but instead is influenced by the groups with which people identify, and by the history that such groups have in relation to these technologies and their proponents.

Appendices

Appendix A

List of articles used for thematic analysis (Chapter 3) by URL.

Articles from El Ciudadano (no dismissed articles) (add the following text to "http://www.elciudadano.cl/2009/09/")
01/investigacion-da-cuenta-de-insustentabilidad-de-represas-proyectadas-en-la-patagonia/
01/tokman-inaugura-planta-que-provoca-cancer-a-habitantes-del-huasco/
02/mapuches-una-nacion-en-su-diversidad/
02/seminario-internacional-derecho-al-agua-%C2%BFpor-que-recuperar-la-gestion-publica-del-agua/
03/todos-somos-mapuches-pinches-bueyes/
05/opacos-mecanismos-de-desarrollo-limpio/
08/esposa-de-desaparecido-en-rio-cuervo-sospecha-cerco-informativo/
10/china-podria-moverse-solo-con-energia-eolica-en-2030/
10/nueva-luz-en-las-negociaciones-de-copenhague/
18/mineria-e-ineficiencia-energetica/
22/avanza-creacion-de-centro-de-excelencia-en-energia/
23/disco-%E2%80%9Cvoces-x-patagonia%E2%80%9D-15-artistas-alzan-su-voz-para-proteger-la-patagonia/
23/impacto-ambiental-irreversible-y-contaminacion-minera/
23/la-corporacion-%C2%BFinstituciones-psicopatas/
23/nuevo-orden-mundial-mineras-contaminacion-deuda-externa-y-universidades/
24/alcalde-de-puchuncavi-ordena-demoler-obras-de-central-campiche/
24/la-nueva-fiebre-del-oro-en-america-latina-y-la-depredacion-de-los-recursos-naturales/
25/la-mineria-es-un-problema-y-debe-ser-tratada-como-tal-una-maldicion-mas-que-una-bendicion/
28/alemania-gira-a-la-derecha-pese-a-avance-de-la-izquierda/
30/conviccion-indigena-vs-colusion-estado-empresarial/

Articles from El Mercurio
(add the following text to “http://diario.elmercurio.cl/detalle/index.asp?id={“)

2312c0a9-a899-44fb-a0e0-fa5c1bfe8716}
88a05594-56ac-4ad5-928d-67731ffb822c}
9c434199-d8fb-4f7f-9fff-22873cfb93bc}
3cca4a3e-51bc-44d0-9ec1-99fb5e479789}
91bb556e-f406-45c9-a73d-00841b7eaf37}
9de00a2d-079f-4b7b-83ce-1c221e7918c5}
dae69ad1-3847-4b90-b80f-1bc1080dfbed}
d35b4c39-73af-438f-b537-bf7383c6c06d}
64b8c3c1-dbd2-4c09-9ad3-1466f086a9a8}
9abb56f3-0cb7-4107-a6d4-c85caf144bd0}
459338ba-1db0-46db-821c-e56a219a7f37}
554af2d3-f821-4b9c-b28a-74b761591b6c}
cf40cf1f-6677-4dd9-86bc-a27b20daf594}
c617d5de-970e-4f15-a98f-b9a5fb2800d9}
50e317bf-46e3-4dc1-a076-814b708d1afd}
c117c0c1-3db7-4b17-96c0-338f731030eb}
c9a9739e-04f5-49fe-b287-303aac748058}
ebf2f212-5c96-4510-93c3-73ea7140d286}
37287c90-00f7-4934-bd9b-c287b0caa0da}
2649569f-682f-4681-b651-99652ae83daf}
1e30b272-13e5-44dc-a4a2-ff09eae9b444}
43d6c999-12c1-47cd-9b6c-bc20313975c7}
50d973ed-b111-4ea4-86ca-dbf99a3d08e3}
539f0940-7612-4a99-8b85-421b40b81fd5}
9b835829-0b98-45bd-8e74-af4d288891e5}
11bab154-aff2-48d4-a3c6-3b7a2e7f721e}
29975a6b-b3f0-4d98-8f30-581323472780}
2ea0d308-e8f1-4719-9b3b-57c714342d3c}
4a8553be-7db5-4e5a-91b9-ccc62c5f4058}
328a4b15-e416-4126-8472-0b4aabac5561}
d3846de5-d400-4fc2-b021-e05e17dac9b6}
a5b6b8f8-7386-4b4b-b621-08744954cea5}
aa983329-b071-4668-b773-88301a666e97}
ad8556cd-ff12-4091-982b-29ff42c1c3d8}
422e0420-dc4b-40db-9f3a-b4b81dcfea2b}
af04ef40-ad4b-49f6-9521-2b532add4889}
b6d4b13f-52b6-4df0-9431-6d59038f8c30}
76329de7-9309-422a-a6f0-64712ace0b22}
8ab6786c-d2f7-45c9-883b-e1bc94c25fc6}
a5446164-335a-4abc-b3b8-04d4ec60367b}
d098f650-bfeb-4d02-922d-79d6d26faf9a}
d987e339-4683-4c4b-bdd0-56d6f36429fb}
fc8e84a6-d844-45f6-a036-76ad64e70363}
0847c199-234f-4ba0-81be-b405178cceb0}
353726ae-7814-44bb-8bed-5743333d3029}
72307898-e30e-4c31-8f68-b2cc2b12247a}
761d13e3-6efe-4930-860e-796b00b3c533}

Dismissed articles from El Mercurio

26f54383-544c-40c6-b341-04d285e1ecc9}
e4ca2d04-a784-42f2-bdcd-2a460f2e302e}
16702364-c94d-4a53-a701-460a3d20ba25}
dbb36042-7f16-468b-8d3a-653f40709787}
ab5c95d7-8fcd-4e9a-95a2-774ac24f6d65}
97adcda0-8e08-48d0-ac2d-db63fccb21e7}
ff857779-87ec-42df-b650-19f9fafa019f}
d09610d8-1e93-4a43-a421-503816dc2954}
25d3e67d-c5cf-4118-accd-7f94d501b71c}
408f9d3a-b3de-42bb-bb08-86155a9d7a43}
78bad95e-75d6-48c5-a2c7-251595ea7c7d}
19510e52-df1c-4ab4-9ffa-8bd9b4f2c36a}
4d346394-693c-44fc-8bbd-20ae3d0bcb32}
e17910a2-3052-4791-a443-7e616ebd2e01}
d73d8367-4675-4e89-9e7a-4e5e3b5c8d14}
57d97bae-1b6a-4900-8ca4-e1c46f74d734}

Articles from La Nación
(add the following text to "http://www.lanacion.cl/")

frei-los-ciudadanos-son-los-encargados-de-evaluar-su-programa-de-gobierno/noticias/2009-09-08/192037.html
candidatos-difieren-por-hidroaysen-y-energia-nuclear/noticias/2009-09-09/011251.html
tokman-ve-baja-de-8-5-10-en-costos-si-se-incorpora-energia-nuclear-a-2027/noticias/2009-09-08/204700.html
2010-franceses-pagaran-tasa-por-emisiones-de-co2/noticias/2009-09-10/114626.html
energia-nuclear-estrategica/noticias/2009-09-10/212311.html
duelo-merkel-steinmeier-solo-discrepancias-matrimoniales/noticias/2009-09-13/201650.html
energia-desde-el-estiercol/noticias/2009-09-13/195749.html
geotermia-y-sus-diversas-posibilidades-de-aplicacion/noticias/2009-09-13/173632.html
corema-del-bio-bio-aprobo-estudio-de-impacto-ambiental-de-central-hidroelectrica-angostura/noticias/2009-09-15/025249.html
edelnor-abastecera-de-energia-al-norte-grande/noticias/2009-09-17/190346.html
antes-no-existia-ningun-incentivo-para-ernc/noticias/2009-09-21/010634.html
energia-eolica-es-la-segunda-mejor-opcion/noticias/2009-09-21/010151.html
explosivo-aumento-en-el-uso-de-energias-limpias/noticias/2009-09-21/005436.html
recuperacion-del-agua-y-funcion-del-estado/noticias/2009-09-23/213652.html
iran-revelo-obras-para-otra-planta-de-uranio-a-la-oiea/noticias/2009-09-25/073707.html
obama-brown-y-sarkozy-amenazan-con-sanciones-por-nueva-planta-irani/noticias/2009-09-25/094204.html
puchuncavi-felicitan-a-alcalde-por-sancion-a-termoelectrica/noticias/2009-09-25/015331.html
alerta-mundial-por-segunda-planta-nuclear-irani/noticias/2009-09-25/200140.html
bosques-en-el-horno/noticias/2009-09-27/200823.html
merkel-empieza-a-delinear-formacion-de-nuevo-gobierno/noticias/2009-09-28/125338.html

Dismissed articles from La Nación

enriquez-ominami-presenta-lineamientos-economicos/noticias/2009-09-07/192918.html
meo-insta-pide-a-sus-contendores-transparentar-financiamiento-de-programas/noticias/2009-09-08/195106.html
greenpeace-advierte-postura-espanola-sobre-cambio-climatico/noticias/2009-09-09/214411.html
petroleo-sangriento/noticias/2009-09-19/220022.html
gobierno-pide-a-legisladores-apurar-tramites-del-proyecto-de-pesca/noticias/2009-09-24/190658.html
angela-merkel-gana-comicios-y-gobernara-con-los-liberales/noticias/2009-09-27/212733.html

Appendix B

Contents of questionnaire used for the studies reported in Chapters 5 and 7 in Spanish and English (N.B. Text presented between square brackets was not included in the questionnaire, but is shown here to clarify the contents of each section and sub-section). Complementary information from participants was recorded from institutional datasets when available.

[Spanish (original)]	[English (translation)]
[Introduction]	
Presentación de la encuesta El presente cuestionario forma parte de una serie de estudios que están llevando a cabo académicos de la Universidad de Sheffield en el Reino Unido, en colaboración con un grupo de Universidades Chilenas. El foco principal es conocer cuáles son sus opiniones respecto a algunos aspectos de la generación de electricidad en Chile, para así poder comprender mejor como las personas desarrollan sus puntos de vista en relación a estos temas. <u>Procedimiento</u> Se le presentará una serie de preguntas que le solicitamos que responda de la manera más directa y franca posible, considerando que no hay respuestas buenas ni malas. Le solicitamos que responda todas las preguntas que pueda. Además le rogamos que lea en su totalidad las instrucciones que se le presentarán en el cuestionario. El cuestionario requiere aproximadamente entre 10 a 15 minutos para responderlo. Su participación en este estudio es completamente voluntaria, y usted puede decidir retirarse sin objeción alguna. <u>Confidencialidad</u> Toda la información que se obtenga en este estudio será estrictamente confidencial y sólo se empleará para fines de investigación académica. Bajo ninguna circunstancia los datos serán utilizados con fines ajenos a estos. En este sentido, el equipo de investigación opera de manera absolutamente independiente de compromisos políticos o económicos, y se rige por códigos éticos internacionalmente validados. <u>Contacto</u> Si usted tiene interés en conocer más sobre este estudio o tiene otra inquietud puede contactarse con el equipo de investigación a través de la siguiente dirección de correo electrónico: [author's email]. Muchas gracias por su valiosa colaboración.	Questionnaire presentation This questionnaire is part of a series of studies being conducted by academics from the University of Sheffield in the UK, in collaboration with Chilean universities. The main focus of this study is to know about your opinions regarding electricity generation issues in Chile, to better understand how people develop their points of view. <u>Procedure</u> A series of questions will be presented to you. We ask you to respond in the most direct and honest possible way, and considering that there are good nor bad responses. Please respond as many questions as you can. Additionally, we request from you to carefully read every instruction included in the questionnaire. This questionnaire takes about 10 to 15 minutes to be responded. Participation in this study is completely voluntary, and you can decide to stop responding without any objections. <u>Confidentiality</u> All the information that you will provide us will be treated with strict confidentiality and it will only be used for academic research. Under no circumstances the data will be used with other purposes. In this respect, the research team in charge of this study is free from any economic or politic compromises, and complies with ethic norms internationally validated. <u>Contact</u> If you would like to know more about this study, or you have any other enquiry, please contact the research team via the following email address: [authors' email]. Many thanks for you valuable contribution.

[Spanish (original)]		[English (translation)]	
[Acceptance of electricity generation technologies]			
[*Heading* / Items] *Señale si USTED está en contra o a favor del uso de las siguientes fuentes energéticas para la generación de electricidad en Chile* - Carbón - Petróleo o diésel - Gas natural - Energía nuclear - Hidroelectricidad - Energía eólica - Energía solar - Energía mareomotriz - Energía geotérmica - Biomasa (agrícola)	[Responses] (-2) Muy en contra (-1) En contra (0) Ni en contra ni a favor (1) A favor (2) Muy a favor	[*Heading* / Items] *State whether you are in favour or against using the following energy sources for electricity generation in Chile* - Coal - Diesel - Natural gas - Nuclear - Hydro - Wind - Solar - Tidal - Geothermal - Biomass	[Responses] (-2) Very much opposed (-1) Opposed (0) Nor opposed nor in favour (1) In favour (2) Very much in favour

[Spanish (original)]		[English (translation)]	
Señale si USTED está o estaría en contra o a favor de la construcción de los siguientes proyectos o propuestas de generación de electricidad en Chile - Central Carbón Castilla (R. Atacama) - Central Carbón Penco (R. Bío-Bío) - Planta Nuclear en Norte Chico (R. Coquimbo) - Planta Nuclear en Zona Central (R. Metrop.) - Proyecto Hidroeléctrico Angostura (R. Bío-Bío) - Proyecto Hidroeléctrico Hidroaysén (R. Aysén) - Parques eólicos en Chiloé (R. Los Lagos) - Parques eólicos en Zona Austral (R. Aysén) - Geotermia en Geiser El Tatio (R. Atacama) - Geotermia en San Gregorio (R. Araucanía)	(-2) Muy en contra (-1) En contra (0) Ni en contra ni a favor (1) A favor (2) Muy a favor	*State whether you are in favour or against the following projects for electricity generation in Chile:* - Coal ("Castilla" in the Atacama region) - Coal ("Penco" in the Bío-Bío region) - Nuclear (in the Coquimbo region) - Nuclear (in the Metropolitan region) - Hydro ("Angostura" in the Bío-Bío region) - Hydro ("Hidroaysén" in the Aysén region) - Wind (in Chiloé, in Los Lagos region) - Wind (in the Aysén region) - Geothermal (in El Tatio, in the Atacama region) - Geothermal (in San Gregorio, in the Araucanía region)	(-2) Very much opposed (-1) Opposed (0) Nor opposed nor in favour (1) In favour (2) Very much in favour
Imagínese que cerca de donde usted vive (a no más de 100 kms.) se está proyectando la construcción de una planta de generación eléctrica, cuál sería SU OPINION si la planta fuera de los siguientes tipos - Carbón - Energía nuclear - Hidroelectricidad - Energía eólica - Energía geotérmica	(-2) Muy en contra (-1) En contra (0) Ni en contra ni a favor (1) A favor (2) Muy a favor	*Imagine that near to where you live (no further than 100 kms. away), a power plant is being proposed. What would your opinion be, if the proposal was of the following type:* - Coal - Nuclear - Hydro - Wind - Geothermal	(-2) Very much opposed (-1) Opposed (0) Nor opposed nor in favour (1) In favour (2) Very much in favour

[Spanish (original)]		[English (translation)]	
[Consequences of electricity generation technologies]			
[*Headings* / Items]	[Responses]	[*Headings* / Items]	[Responses]
Indique que tan malo o bueno cree usted que es para los siguientes temas el desarrollo de ["plantas de carbón", "plantas de energía nuclear", "hidroeléctricas" "parques eólicos", "plantas geotérmicas"] para la generación eléctrica en Chile - Situación climática global - Economía del país - Bienestar de los chilenos - Medio ambiente de zonas cercanas - Economía de las zonas cercanas - Salud y seguridad de los habitantes cercanos - Estilo de vida de los habitantes cercanos - Derechos de los habitantes cercanos	(-2) Muy malo (-1) Malo (0) Ni bueno ni malo (1) Bueno (2) Muy bueno	*Considering each of the following criteria, state how good or bad do you consider to be the development of ["coal", "nuclear", "hydro", "wind", "geothermal"] power stations in Chile* - Global climate situation - National economy - Wellbeing of Chileans - Local environment - Local economy - Health and safety of residents near - Lifestyle of residents near - Rights of residents near	(-2) Very bad (-1) Bad (0) Neither good nor bad (1) Good (2) Very good

[Spanish (original)]		[English (translation)]	
[Trust in stakeholders]			
[*Headings* / Items]	[Responses]	[*Headings* / Items]	[Responses]
¿Qué tan bien PREPARADAS cree usted que están las siguientes instituciones respecto a su función en la generación de electricidad en Chile? - Gobierno - Compañías Chilenas de Generación Eléctrica - Compañías Extranjeras de Generación Eléctrica - Ingenieros Chilenos - Ingenieros Extranjeros	(1) Nada preparados (2) (3) (4) (5) Muy bien preparados	*How well prepared do you think the following institutions are regarding their role in electricity generation in Chile?* - Government - Chilean electricity generation companies - Foreign electricity generation companies - Chilean engineers - Foreign engineers	(1) Not at all prepared (2) (3) (4) (5) Very well prepared
¿Qué tan INTERESADOS EN EL BIENESTAR SOCIAL cree usted que están las siguientes instituciones respecto a su función en la generación eléctrica en Chile? - Gobierno - Compañías Chilenas de Generación Eléctrica - Compañías Extranjeras de Generación Eléctrica - Ingenieros Chilenos - Ingenieros Extranjeros	(1) Nada interesados (2) (3) (4) (5) Muy interesados	*How interested in social wellbeing do you think that the following institutions are regarding their role in electricity generation in Chile?* - Government - Chilean electricity generation companies - Foreign electricity generation companies - Chilean engineers - Foreign engineers	(1) Not interested at all (2) (3) (4) (5) Very much interested

[Spanish (original)]		[English (translation)]	
En términos generales, respecto a la generación de electricidad en Chile, ¿cuál es su nivel de CONFIANZA en las siguientes instituciones? - Gobierno - Compañías Chilenas de Generación Eléctrica - Compañías Extranjeras de Generación Eléctrica - Ingenieros Chilenos - Ingenieros Extranjeros	(1) Ninguna confianza (2) (3) (4) (5) Mucha confianza	*In overall, how much trust do you hold in the following institutions regarding their role in electricity generation in Chile?* - Government - Chilean electricity generation companies - Foreign electricity generation companies - Chilean engineers - Foreign engineers	(1) No trust at all (2) (3) (4) (5) Much trust

[Identification with groups]

[*Heading* / Items]	[Responses]	[*Heading* / Items]	[Responses]
¿Siente usted que comparte una identidad en común con los siguientes grupos en Chile?-Gobierno - La mayoría de los Chilenos - Personas que proponen proyectos eléctricos - Personas que viven cercanos a proyectos eléctricos - Personas de ascendencia marcadamente Indígena - Personas de ascendencia marcadamente Europea	(1) Muy poco (2) (3) (4) (5) Mucho	Do you feel that you share an identity in common with the following groups in Chile? - Most Chileans - Proponents of electricity projects - Residents living near to electricity projects - People of marked indigenous ancestry - People of marked european ancestry	(1) Very little (2) (3) (4) (5) Very much

[Spanish (original)]		[English (translation)]	
[Demographics]			
[Items]	[Responses]	[Items]	[Responses]
Sexo	(0) Hombre (1) Mujer	Sex	(0) Male (1) Female
Edad	[blank space]	Age	[blank space]
Nacionalidad	(0) Chileno(a) (1) Otro	Nationality	(0) Chilean (1) Other
¿Con cuál orientación política usted se identifica mejor?	(1) Izquierda (2) Centro Izquierda (3) Centro (4) Centro Derecha (5) Derecha Ninguna	What political orientation do you identify yourself better with?	(1) Left-wing (2) Centre-Left (3) Centre (4) Centre-Right (5) Right-wing None
¿Cuál de los siguientes términos siente usted que representa mejor su origen Étnico?	(1) De ascendencia completamente indígena (2) Mestizo (marcadamente más indígena) (3) Mestizo (por igual) (4) Mestizo (marcadamente más europeo) (5) De ascendencia completamente europea Otro (indique cuál)	Which of the following terms do you feel that represents better your ethnicity?	(1) Completely indigenous ancestry (2) Mixed (more indigenous) (3) Mixed (equally) (4) Mixed (more European) (5) Completely European ancestry Other (state which)
Indique su nivel de interés en temas de generación eléctrica	(1) Muy poco (2) (3) (4) (5) Mucho	State your level of interest in electricity generation issues	(1) Very little (2) (3) (4) (5) Very much
Indique su nivel de conocimiento en temas de generación eléctrica	(1) Muy poco (2) (3) (4) (5) Mucho	State your level of knowledge about electricity generation issues	(1) Very little (2) (3) (4) (5) Very much
En su opinión, indique en qué nivel el actual cambio climático global, es un proceso normal de la naturaleza, o un fenómeno generado por el ser humano	(1) Proceso natural (2) (3) (4) (5) Generado por el ser humano	State whether climate change is a natural process, or it is the outcome of human activity	(1) Natural process (2) (3) (4) (5) Outcome of human activity

[Spanish (original)]		[English (translation)]	
Indique el nivel más alto de escolaridad que haya alcanzado alguno de sus padres (o cuidadores)	(1) Ed. Básica (2) Ed. Media (3) Ed. Universitaria (4) Ed. Postgrado	State the highest level of education achieved by one of your parents (or carers)	(1) Primary school (2) High-school (3) Higher-education (4) Postgraduate

Appendix C

Contents of questionnaire with experimental manipulation used for the study reported in Chapter 5 in Spanish and English (N.B. Text presented between square brackets was not included in the questionnaire, but is shown here to clarify the contents of each section and sub-section). The presentation order of sections B, C and D, and the order of items for each section were randomised. Gender, age, and other demographic information were obtained through records in institutional datasets.

[Spanish (original)]	[English (translation)]
[Section A: Introduction]	
Presentación de la encuesta El presente cuestionario forma parte de una serie de estudios que están llevando a cabo académicos de la Universidad de Sheffield en el Reino Unido, en colaboración con un grupo de Universidades Chilenas. El foco principal es conocer cuáles son sus opiniones respecto a algunos aspectos de la generación de electricidad en Chile, para así poder comprender mejor como las personas desarrollan sus puntos de vista en relación a estos temas. Procedimiento Se le presentará una serie de preguntas que le solicitamos que responda de la manera más directa y franca posible, considerando que no hay respuestas buenas ni malas. Le solicitamos que responda todas las preguntas que pueda. Además le rogamos que lea en su totalidad las instrucciones que se le presentarán en el cuestionario. El cuestionario requiere aproximadamente entre 8 a 12 minutos para responderlo. Su participación en este estudio es completamente voluntaria, y usted puede decidir retirarse sin objeción alguna. Confidencialidad Toda la información que se obtenga en este estudio será estrictamente confidencial y sólo se empleará para fines de investigación académica. Bajo ninguna circunstancia los datos serán utilizados con fines ajenos a estos. En este sentido, el equipo de investigación opera de manera absolutamente independiente de compromisos políticos o económicos, y se rige por códigos éticos internacionalmente validados. Contacto Si usted tiene interés en conocer más sobre este estudio o tiene otra inquietud puede contactarse con el equipo de investigación a través de la siguiente dirección de correo electrónico: [author's email]. Muchas gracias por su valiosa colaboración.	Questionnaire presentation This questionnaire is part of a series of studies being conducted by academics from the University of Sheffield in the UK, in collaboration with Chilean universities. The main focus of this study is to know about your opinions regarding electricity generation issues in Chile, to better understand how people develop their points of view. Procedure A series of questions will be presented to you. We ask you to respond in the most direct and honest possible way, and considering that there are good nor bad responses. Please respond as many questions as you can. Additionally, we request from you to carefully read every instruction included in the questionnaire. This questionnaire takes about 8 to 12 minutes to be responded. Participation in this study is completely voluntary, and you can decide to stop responding without any objections. Confidentiality All the information that you will provide us will be treated with strict confidentiality and it will only be used for academic research. Under no circumstances the data will be used with other purposes. In this respect, the research team in charge of this study is free from any economic or politic compromises, and complies with ethic norms internationally validated. Contact If you would like to know more about this study, or you have any other enquiry, please contact the research team via the following email address: [authors' email]. Many thanks for you valuable contribution.

[Spanish (original)]	[English (translation)]

[Section B: Dominant And Subordinate *Group-id*s (CV)]

Preguntas sobre su identidad		Questions about your identity	
[*Heading* / Items]	[Responses]	[*Heading* / Items]	[Responses]
Indique que tan de acuerdo o en desacuerdo está USTED con las siguientes afirmaciones - Me identifico con Chile [a] - Chile es mejor que la mayoría de los otros países [a] - Es importante que Chile se diferencie de los otros países [a] - Me siento apegado al resto de los chilenos [a] - Soy un típico chileno [a] - Los chilenos son más trabajadores que los habitantes de otros países [a] - Soy muy diferente a los otros Chilenos [a c] - Me siento conectado a las minorías en Chile [b] - Los grupos étnicos minoritarios son importantes para mí [b] - Cuando me veo a mí mismo, me veo como parte de una minoría en Chile [b] - Me cuesta sentirme apegado a las minorías étnicas en Chile [b c]	(-3) Muy en desacuerdo (-2) En desacuerdo (-1) Algo en desacuerdo (0) Ni en desacuerdo ni de acuerdo (1) Algo de acuerdo (2) De acuerdo (3) Muy de acuerdo	*How much do you agree or disagree with the following statements* - I identify myself with Chile [a] - Chile is better than most other countries [a] - It is important for Chile to be different to other countries [a] - I feel close to the rest of Chileans [a] - I am a typical Chilean [a] - Chileans work harder than people in other countries [a] - I am very different from other Chileans [a c] - I feel connected to minorities in Chile [b] - Ethnic minorities are important for me [b] - I see myself as part of an ethnic minority in Chile [b] - I find it hard to feel myself close to Chilean ethnic minorities [b c]	(-3) Strongly disagree (-2) Disagree (-1) Somewhat disagree (0) Nor agree nor disagree (1) Somewhat agree (2) Agree (3) Strongly agree

Notes:
[a] Items for dominant *group-id* (most-chileans)
[b] Items for subordinate *group-id*
[c] Item with reversed-score

[Spanish (original)]		[English (translation)]	
[Section C: Trust (CV)]			
Preguntas sobre su confianza en instituciones y medios			
[*Headings* / Items]	[Responses]	[*Headings* / Items]	[Responses]
Indique el nivel de confianza que EN GENERAL usted tiene en los siguientes medios de prensa escrita en Chile - Diarios ciudadanos locales - La Segunda - El Mostrador - El Ciudadano - La Tercera - El Mercurio	(-3) Mucha desconfianza (-2) Mediana desconfianza (-1) Algo de desconfianza (0) Ni desconfianza ni confianza (1) Algo de confianza (2) Mediana confianza (3) Mucha confianza	*State how much trust or distrust, in general terms, do you have in the following Chilean printed media sources* - Local citizen newspapers - La Segunda - El Mostrador - El Ciudadano - La Tercera - El Mercurio	(-3) Much distrust (-2) Distrust (-1) Somewhat distrust (0) Nor trust nor distrust (1) Somewhat trust (2) Trust (3) Much trust
En cuanto a temas relacionados a la generación de electricidad en Chile, indique el nivel de confianza o desconfianza que le generan a USTED las siguientes instituciones - Compañías nacionales - Compañías europeas - Compañías estadounidenses - El gobierno central - El gobierno regional - El ministerio de energía	(-3) Mucha desconfianza (-2) Mediana desconfianza (-1) Algo de desconfianza (0) Ni desconfianza ni confianza (1) Algo de confianza (2) Mediana confianza (3) Mucha confianza	*State how much trust or distrust do you have in the following institutions in relation to their role in electricity generation in Chile* - National companies - European companies - Companies from the United States - Central government - Regional government - Energy ministry	(-3) Much distrust (-2) Distrust (-1) Somewhat distrust (0) Nor trust nor distrust (1) Somewhat trust (2) Trust (3) Much trust

[Spanish (original)]		[English (translation)]	
[Section D: Pre-Condition Attitudes (CV)]			
Preguntas sobre la generación de electricidad en Chile			
[*Headings* / Items]	[Responses]	[*Headings* / Items]	[Responses]
Indique que tan de acuerdo está con la siguiente afirmación para cada uno de los siguientes casos: "Creo que el desarrollo de esta fuente de generación de electricidad es riesgoso para los Chilenos" - Energía Nuclear - Termoeléctricas - Hidroelectricidad - Energía Geotérmica - Energía Eólica	(-3) Muy en desacuerdo (-2) En desacuerdo (-1) Algo en desacuerdo (0) Ni en desacuerdo ni de acuerdo (1) Algo de acuerdo (2) De acuerdo (3) Muy de acuerdo	*State how much do you agree with the following statement for each technology: "I believe that the development of this electricity generation source is risky for Chileans"* - Nuclear - Coal - Hydro - Geothermal - Wind	(-3) Strongly disagree (-2) Disagree (-1) Somewhat disagree (0) Nor agree nor disagree (1) Somewhat agree (2) Agree (3) Strongly agree
Indique que tan de acuerdo está con la siguiente afirmación para cada uno de los siguientes casos: "Creo que el desarrollo de esta fuente de generación de electricidad es beneficioso para los Chilenos" - Energía Nuclear - Termoeléctricas - Hidroelectricidad - Energía Geotérmica - Energía Eólica	(-3) Muy en desacuerdo (-2) En desacuerdo (-1) Algo en desacuerdo (0) Ni en desacuerdo ni de acuerdo (1) Algo de acuerdo (2) De acuerdo (3) Muy de acuerdo	*State how much do you agree with the following statement for each technology: "I believe that the development of this electricity generation source is beneficial for Chileans"* - Nuclear - Coal - Hydro - Geothermal - Wind	(-3) Strongly disagree (-2) Disagree (-1) Somewhat disagree (0) Nor agree nor disagree (1) Somewhat agree (2) Agree (3) Strongly agree
Señale si USTED está en contra o a favor del uso de las siguientes fuentes energéticas para la generación de electricidad en Chile - Energía Nuclear - Termoeléctricas - Hidroelectricidad - Energía Geotérmica - Energía Eólica	(-3) Muy en contra (-2) En contra (-1) Un poco en contra (0) Ni en contra ni a favor (1) Un poco a favor (2) A favor (3) Muy a favor	*State whether you are in favour or against using the following energy sources for electricity generation in Chile* - Nuclear - Coal - Hydro - Geothermal - Wind	(-3) Very much opposed (-2) Opposed (-1) A little opposed (0) Nor opposed nor in favour (1) A little in favour (2) In favour (3) Very much in favour

[Spanish (original)]	[English (translation)]
[Section E: Experimental Conditions (IVs)]	
[VIGNETTE ARRANGEMENT] *"Lea el siguiente texto por favor.* *Antes de proseguir con la encuesta, le solicitamos que pueda leer en su totalidad y con atención los siguientes párrafos extraídos* [TEXT-SOURCE] *en los meses pasados:* *Comentario sobre el desarrollo de proyectos hidroeléctricos* [TEXT-VALENCE] *(texto extraído* [TEXT-SOURCE] *en Enero de 2012)"* [Content between square brackets in vignette was replaced as follows: FOR TEXT-SOURCE (IV): (dominant-source) "*del Diario El Mercurio*" (subordinate-source) "*del Diario El Ciudadano*" (unknown) "…" [left empty] FOR TEXT-VALENCE (IV): (anti-hydro) Los proyectos hidroeléctricos en Chile ha sido fuertemente apoyados y respaldados, principalmente por los esperados beneficios económicos asociados a su implantación, y como manera de asegurar una suficiente capacidad energética de acuerdo a la creciente demanda que existe sin emisiones de gases que contribuyen al problema del calentamiento global. Sin embargo, a pesar de los beneficios que se esperarían, parece claro que el problema principal es el de la conservación de los medios ambientes donde se pretenden construir estas plantas eléctricas. Y es que está claro que a la hidroelectricidad no se le puede considerar una energía totalmente limpia, por lo que es lógico desestimar el desarrollo de estas generadoras eléctricas, que además no son el único recurso que tenemos en Chile. El daño ecológico que provoca este tipo de proyectos no tiene comparación, si se contrasta con otras posibilidades de proyectos energéticos. Por todo esto, se hace vital proteger el medio ambiente en Chile, y se enfoquen	[VIGNETTE ARRANGEMENT] *"Please read the following text.* *Before proceeding with the survey, we request from you to read in detail the following text extracted* [TEXT-SOURCE] *in the past months:* *Commentary on the development of hydroelectric projects* [TEXT-VALENCE] *(text extracted* [TEXT-SOURCE] *in January 2012)"* [Content between square brackets in vignette was replaced as follows: TEXT-SOURCE: (dominant-source) "*from Diario El Mercurio*" (subordinate-source) "*from Diario El Ciudadano*" (unknown) "…" [left empty] TEXT-VALENCE: (anti-hydro) Hydro projects in Chile have been strongly supported and backed up, mostly because of the economic benefits that are expected from their implementation; and because they ensure enough capacity; considering the growing demand, without emitting the gases that contribute to global warming. Nevertheless, even considering the expected benefits, it seems to be clear that the main problem is the conservation of the local environments where these power plants are projected. It is pretty clear that hydro cannot be considered a completely clean energy, and therefore, it is logical to dismiss the development of these power plants; especially considering that they are not the only available resource. The environmental damage that these plants generate cannot be compared to other types of projects. For all of these reasons, it is vital to

[Spanish (original)]	[English (translation)]
los esfuerzos en otro tipo de desarrollos productivos de electricidad. La aprobación de estos proyectos en décadas pasadas, no nos han permitido estar menos contaminados, ni ha ayudado sustancialmente a los chilenos o a los pobladores cercanos a estos desarrollos, sino que ha creado situaciones de injusticia social donde se han vulnerado los derechos de las personas.	protect the environment in Chile, and focusing diverse efforts in other types of electricity generation developments. The approval of these projects in past decades, has not allowed us to have less contamination, nor it has substantially helped Chileans or residents near, but instead it has created situations of social injustice where the rights of people have been ignored.
(pro-hydro) Los proyectos hidroeléctricos en Chile ha estado cargado de controversia por una importante oposición y una serie de dificultades en su desarrollo asociados a algunos de los efectos ambientales y sociales locales que estos proyectos implican. Sin embargo, a pesar de las complejidades que enfrentan, parece claro que el problema principal del medio ambiente a nivel mundial, es el calentamiento global. Está claro que la hidroelectricidad es una energía totalmente limpia y así es considerada globalmente, por lo que es lógico privilegiar el desarrollo de este potencial, que además es, el principal recurso que tenemos en Chile. El daño ecológico que provoca este tipo de proyectos no tiene comparación, si se contrasta con otro tipo de proyectos energéticos. En este mismo sentido, se hace vital proteger el medio ambiente en Chile, pero con proyectos. Es razonable que se privilegien muchas cuencas para protección del medio ambiente y se dejen otras para desarrollos productivos de electricidad. Si algunos de estos proyectos se hubiesen aprobado hace una década, nos hubiera permitido estar menos contaminado y con una energía bastante más barata para los Chilenos, ubicando al país en una situación de mayor competencia y seguridad energética, óptima para un mejor progreso económico y social a nivel nacional, y con beneficios para los municipios y pobladores cercanos a estos proyectos.	(pro-hydro) Hydro projects in Chile have met controversy because of a strong opposition, and a series of difficulties in their developments which have been linked to local environmental and societal consequences that these projects imply. Nevertheless, despite these complexities, it seems to be clear that the main problem is that of the environment at a global scale, this means global warming. It is clear that hydro is a completely clean energy, and so it is considered globally, and therefore, it is logical to privilege these kinds of projects. Especially considering that it is the main available resource. The environmental damage that these plants generate cannot be compared to other types of projects. In a same sense, it is vital to protect local environment in Chile through these projects. It is reasonable to privilege many rivers for preservation, but also for electricity generation. If more previous projects would have been approved, we could have had less contamination, with way cheaper energy, allowing competition advantages for Chile with energy security; optimal for economic and societal progress at the national level, with benefits for municipalities and residents living near.
(neutral) En una central hidroeléctrica se utiliza energía hidráulica para la generación de energía eléctrica. Son el resultado actual de la evolución de los antiguos molinos que aprovechaban la corriente de los ríos para mover una rueda. En general, estas centrales aprovechan la	(neutral) In a hydroelectric station, hydraulic energy is used to generate electricity. These are the result from the evolution of old watermills that used the current of rivers to move a wheel. In general, these stations use the potential energy that a mass of water from a natural river bed possesses when there is a slope, which is also known as the geodesic curve. The water that moves from one height to another is passed through a hydraulic turbine that transmits the energy to a generator that transforms it to electricity.

[Spanish (original)]	[English (translation)]
energía potencial que posee la masa de agua de un cauce natural en virtud de un desnivel, también conocido como salto geodésico. El agua en su caída entre dos niveles del cauce se hace pasar por una turbina hidráulica la cual transmite la energía a un generador donde se transforma en energía eléctrica. Algunas características principales de una central hidroeléctrica, desde el punto de vista de su capacidad de generación de electricidad son: - Su potencia, que está en función del desnivel existente entre el nivel medio del embalse y el nivel medio de las aguas debajo de la central, y del caudal máximo que pueden usar las turbinas. - Las características de las turbinas y de los generadores usados en la transformación. La energía esperada de una central se calcula en función de estas características en lapsos de tiempo definidos.]	Some of the central features of a hydroelectric station, in relation to its generation of electricity are: - Its potency, which is defined in terms of the slope between the midpoint of the reservoir and the midpoint of the waters below the station, and of the maximum flow that the turbines can use. - The characteristics of the turbines and generators used in the energy transformation. These characteristics are used to define the energy expected from a hydroelectric station is estimated in defined lapses of time.]

[Spanish (original)]		[English (translation)]	
[Section F: Text-Credibility (DV)]			
Preguntas sobre el texto			
[*Heading* / Items]	[Responses]	[*Heading* / Items]	[Responses]
En relación al texto leído, indique cuan de acuerdo está con las siguientes afirmaciones - El texto me da confianza - Me parece que el contenido está escrito con honestidad - Me parece que el contenido está escrito con veracidad	(-3) Muy en contra (-2) En contra (-1) Un poco en contra (0) Ni en contra ni a favor (1) Un poco a favor (2) A favor (3) Muy a favor	*In relation to the text that you have just read, state how much do you agree with the following statements* - I consider the text to be credible - I perceive that the contents have been written with honesty - I perceive that the contents have been written with veracity	(-3) Strongly disagree (-2) Disagree (-1) Somewhat disagree (0) Nor agree nor disagree (1) Somewhat agree (2) Agree (3) Strongly agree

[Spanish (original)]	[English (translation)]
[Section G: Post-Condition Attitudes (DV)]	

Aceptabilidad y evaluación de plantas de generación eléctrica		Acceptability and evaluation of electricity generation plants	
[*Headings* / Items]	[Responses]	[*Headings* / Items]	[Responses]
Que tan aceptable le parecería a usted el desarrollo de una de las siguientes plantas energéticas en la región en que usted vive - Energía Nuclear - Termoeléctricas - Hidroelectricidad - Energía Geotérmica - Energía Eólica	(-3) Muy inaceptable (-2) Inaceptable (-1) Un poco inaceptable (0) Ni aceptable ni inaceptable (1) Un poco aceptable (2) Aceptable (3) Muy aceptable	*How acceptable would you consider to be the development of one of the following power plants in the region where you live* - Nuclear - Coal - Hydro - Geothermal - Wind	(-3) Very unacceptable (-2) Unacceptable (-1) Somewhat unacceptable (0) Nor acceptable nor unacceptable (1) Somewhat acceptable (2) Acceptable (3) Very acceptable
Que tan aceptable le parecería a usted el desarrollo de una de las siguientes plantas energéticas en una región diferente a en la que usted vive - Energía Nuclear - Termoeléctricas - Hidroelectricidad - Energía Geotérmica - Energía Eólica	(-3) Muy inaceptable (-2) Inaceptable (-1) Un poco inaceptable (0) Ni aceptable ni inaceptable (1) Un poco aceptable (2) Aceptable (3) Muy aceptable	*How acceptable would you consider to be the development of one of the following power plants in a region different to where you live* - Nuclear - Coal - Hydro - Geothermal - Wind	(-3) Very unacceptable (-2) Unacceptable (-1) Somewhat unacceptable (0) Nor acceptable nor unacceptable (1) Somewhat acceptable (2) Acceptable (3) Very acceptable

[Spanish (original)]		[English (translation)]	
Indique que tan malo o bueno cree usted que es para los siguientes temas el desarrollo de ["plantas de carbón", "plantas de energía nuclear", "hidroeléctricas" "parques eólicos", "plantas geotérmicas"] para la generación eléctrica en Chile - Situación climática global - Economía del país - Bienestar de los chilenos - Medio ambiente de zonas cercanas - Economía de las zonas cercanas - Salud y seguridad de los habitantes cercanos - Estilo de vida de los habitantes cercanos - Derechos de los habitantes cercanos	(-3) Muy malo (-2) Malo (-1) Un poco malo (0) Ni bueno ni malo (1) Un poco bueno (2) Bueno (3) Muy bueno	*Considering each of the following criteria, state how good or bad do you think it is the development of ["coal", "nuclear", "hydro", "wind", "geothermal"] power stations in Chile* - Global climate situation - National economy - Wellbeing of Chileans - Local environment - Local economy - Health and safety of residents near - Lifestyle of residents near - Rights of residents near	(-3) Very bad (-2) Bad (-1) Somewhat bad (0) Nor good nor bad (1) Somewhat good (2) Good (3) Very good

[Spanish (original)]		[English (translation)]	
[Section H: Demographics]			
Información Demográfica		Demographic Information	
[Items]	[Responses]	[Items]	[Responses]
¿Cuál de los siguientes términos siente usted que representa mejor su origen Étnico?	(1) De ascendencia completamente indígena (2) Mestizo (marcadamente más indígena) (3) Mestizo (algo más indígena) (4) Mestizo (por igual) (5) Mestizo (algo más extranjero) (6) Mestizo (marcadamente más extranjero) (7) De ascendencia completamente extranjera	Which of the following terms do you feel that represents better your ethnicity?	(1) Completely indigenous ancestry (2) Mixed (more indigenous) (3) Mixed (somewhat more indigenous) (4) Mixed (equally) (5) Mixed (somewhat more foreign) (6) Mixed (more foreign) (7) Completely foreign ancestry
¿Cuál de los siguientes términos siente usted que representa mejor su orientación política? (o aquella opción que sienta menos lejana)	(1) Muy de izquierda (2) De izquierda (3) Un poco de izquierda (4) De centro (5) Un poco de derecha (6) De derecha (7) Muy de derecha	Which of the following terms do you feel that represents better your political orientation (or that which you feel less far from you)?	(1) Very much leftist (2) Leftist (3) Somewhat leftist (4) Centre (5) Somewhat right-winger (6) Right-wing (7) Very much right-winger
Indique el nivel más alto de escolaridad que haya alcanzado alguno de sus padres o quién haya estado a cargo de su cuidado	(1) Ed. Básica (2) Ed. Media (3) Ed. Universitaria (4) Ed. Postgrado	State the highest level of education achieved by one of your parents (or carers)	(1) Primary school (2) High-school (3) Higher-education (4) Postgraduate

[Spanish (original)]	[English (translation)]
[Section I: Debrief]	
Muchas gracias por su valiosa participación. Habiendo respondido el cuestionario, podemos entregarle más información sobre los objetivos de esta encuesta, que además, cuenta con un carácter experimental. Complementariamente al propósito de conocer su opinión sobre estas materias, el estudio en que usted ha participado tiene por fin evaluar las relaciones que existen entre aspectos de la identidad e las personas y sus opiniones en relación a proyectos de generación eléctrica. Por otro lado también se pretende estudiar la influencia de los medios de prensa escrito en el desarrollo de las percepciones en relación a estos temas. Para esto se generaron condiciones experimentales, de entre las cuales usted fue asignado aleatoriamente a una de estas. El texto que usted leyó se formó a partir de diversas fuentes, sin embargo, a distintos grupos de participantes se les mostrará que este mismo texto tiene otra(s) fuente(s). Así mismo, a otros participantes se les presentará un texto con características diferentes (de un tono positivo, negativo, o neutro en relacion a la hidroelectricidad). Usando esta metodología podremos evaluar si se observan algunas diferencias entre grupos en cuanto a las opiniones expresadas posteriormente a leer los distintos párrafos. Reiteramos nuestro compromiso ético con la información de la cual nos ha provisto, y aseguramos nuestra total independencia de intereses de grupos políticos o de compañía alguna, y aseguramos que los datos recopilados serán analizados por el equipo investigador con fines de carácter puramente académico y científico. Si desea más información sobre estos estudios, puede contactarse con el equipo investigador en la siguiente dirección de correo electrónico: [author's email].	Thank you very much for your valuable participation Having responded our questionnaire, we can provide you further information about the purposes of this survey, which had an experimental section. Additionally to knowing your views on these subjects, this study ha assessing relationships between social identities that people hold and their opinions in relation to projects for generation. On the other hand, the study also seeks to understand the influence of the printed press on the development of perceptions regarding these issues. For this reason, experimental conditions were devised, from which you were randomly assigned to one. The text you were asked to carefully read was formed from diverse sources, however, for differnent groups of participants it was shown that the same text had a different source. As well, other participants will be shown a text with different characteristics (which could be positive, negative, or neutral in relation to hydroelectricity). Using this method we will be able to evaluate whether there are differences in opinions between groups when they read different texts. We restate our ethical compromise with the information that you have provided us, and we ensure our total independece from any lobby groups, and we ensure that the data will only be analysed by the research team, and serving academic and scientific purposes. If you would like to know more about this study, you can contact the research team in the following email address: [author's email].

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