

Guidelines for Annotating Argument Components and Relations in Persuasive Essays

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1 Introduction

Argument Recognition is an interdisciplinary research field that incorporates philosophy, psychology linguistics and computer science for establishing argumentation models and automated methods for identifying arguments in written texts. These tools will not only provide novel possibilities for educational applications like intelligent writing assistance, information retrieval platforms or automated assessment tools but will also open new opportunities for improving current legal information retrieval applications or policy modeling platforms. However, a major prerequisite for developing novel *Natural Language Processing* (NLP) methods that are able to identify argumentative components and relations in written texts is the availability of annotated corpora. Due to this requirement and the complex structure of argumentative discourse, “*the automatic detection of arguments has been left nearly unstudied*” till 2008 [1].

The goal of this study is to create a language resource for argument recognition by manually annotating argument components and argumentative relations in persuasive essays. Since the annotation of arguments is a complex task for humans, this tutorial first provides a brief introduction to the field of argumentation including the definitions of argument components before describing the steps of the annotation in detail.

An argument consists of several statements. In its simplest form, it includes one *claim* that is supported by at least one *premise* [2] [3] [4]. The claim (or also called conclusion [5]) represents a statement that can either be true or false. Thus the claim is a controversial statement that is debatable and should not be accepted by the reader without additional support. This characteristic distinguishes arguments from explanations where the conclusion is a true statement that is not arguable (e.g. an event that happened in the past). The second component of an argument, the premise (or sometimes called support [6] or reason [3]), underpins the plausibility of the claim. It is usually added by the proponent (writer) for persuading the reader of the claim. Considering the simplest form of an argument as described here, a premise can be seen as a justification for the claim, whereas more complex argumentation structures can also include premises that aim at refuting a claim. These more complex structures are basically graphs that connect premises and claims by means of different relations. Figure 1 illustrates the simplest form of an argument consisting of only one claim that is supported by one premise.

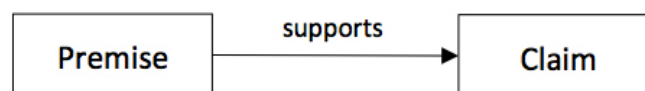


Figure 1: Simplest form of an argument

Even such a simple form of an argument can be expressed in many different ways in written text. Some example patterns that can be found in written argumentation are the following (note that there are many different ways of expressing arguments in written texts and that these examples are only a small collection. For instance the cue phrases in these patterns are often omitted or misleadingly used in real texts):

<claim> because <premise>.

Since <premise> it is feasible that <claim>.

In view of the fact that <premise> it follows that <claim>.

<premise>. Therefore, <claim>.

...

The structures we will discover in persuasive essays are usually more complex and consist of several premises that either support or attack a certain claim. The following sections describe the annotation process and the considered annotations in detail. The guideline also includes example annotations that facilitate the annotation task.

2 Overview of the Annotation Process

The annotation step is divided in two different steps. In the first step we aim at annotating argument components ((major-) claims and premises) in each paragraph of the essay. This step is conducted at the clause level. In the second step those components are linked using support or attack relations. Figure 2 illustrates the annotation process.

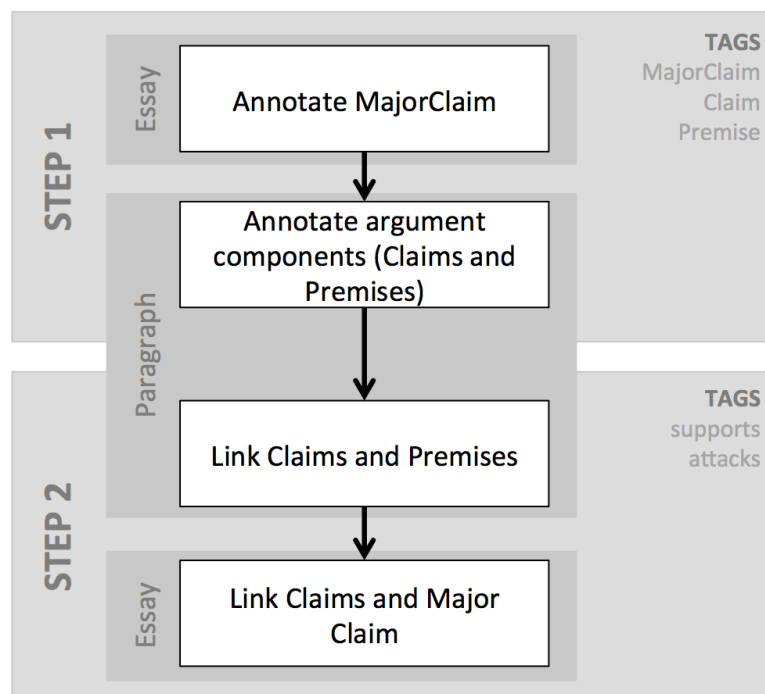


Figure 2: Overview of the annotation process

3 Step1: Annotation of Argument Components

In the first step of the annotation, we focus on the identification of argument components (claims and premises) at the clause level. Since the context and the author's stance are crucially important for identifying these components, the whole essay has to be read before starting with the actual annotation task. The goal is to identify the topic of the essay and the stance of the author with respect to the topic. Both, the *topic* and the *author's stance*, that can either be for, against or neutral will be inserted in an additional spreadsheet that is provided by the supervisor. Thus the preparation of the annotation task includes the following steps:

1. Read the entire document
2. Insert topic and author's stance into the provided spreadsheet.

The following sections of this chapter describe the annotation of argument components (major claims, claims and premises) in detail.

3.1 Annotation of the Major Claim

In persuasive essays the major claim directly expresses the general stance of the author that is supported by additional arguments. So it is often an opinionated expression with respect to the topic that is indicated by a stance expression. For instance, expressions like *"I am against"*, *"In my opinion"* or *"I strongly believe that"* indicate the presence of a major claim in persuasive essays.

In most cases the major claim is included in the introduction or in the conclusion. In the introduction, the major claim has the characteristics of a general assertion or an opinion with respect to the topic, whereas in the conclusion the major claim summarizes the argumentation according to the author's stance. If the major claim is included in the introduction as well as in the conclusion, the most representative expression with respect to the topic should be selected. In each document, only one major claim should be annotated. In the case if the introduction and the conclusion includes exactly identical major claims we will annotate the statement in the introduction as a major claim and consider the claim in the conclusion as a claim (3.2).

In some cases the author does not include a major claim. This is often the case if the author has a neutral stance with respect to the topic. So the tag "MajorClaim" should only be used if there is a major claim present in the essay.

To separate major claims from other statements, the annotation of the major claim is conducted at the clause level. The annotation should include a sequence of words that represents a complete statement. In other words, the major claim should be annotated as an independent statement that can be used in isolation. The following examples illustrate the segmentation of the major claim (the major claim is in bold face):

Example 1: “Therefore, **people should not have babies.**”

Example 2: “However, it is my opinion that **children are far away from being the ultimate bliss** in our lives.”

Example 3: „To sum up, **grading students is not a good practice and should be abolished.**“

(Note, that the punctuation is not included in the annotation)

For identifying major claims the following questions can facilitate the decision and should be asked for each sentence in the introduction or in the conclusion of the essay:

- Does the sentence include a statement that represents the major stance of the author with respect to the topic?
- Does the sentence include the most explicit stance expression in the introduction and conclusion of the essay?

3.2 Annotation of Claims

The central component of an argument is the claim or also called conclusion [5]. It is an assertion that should not be accepted without support given by a set of reasons called premises. A claim can either appear as a conclusion where it has the character of a consequence or as an initial assertion that is supported by reasons in subsequent statements. For example “*Therefore, high birth rates in a population is a very serious problem*”, “*For this reason, cooperation plays a major role during primary education*” or “*In conclusion, sustaining the cultural values is essential for immigrants*” are claims that are expressed as conclusions. In those cases the claim is usually located near the end of a paragraph and the reasons are given before. If the claim appears before the reasons (premises) it has the character of an initial assertion. For instance “*Studying overseas is an irreplaceable experience*”, “*Tourists from different cultures will cause changes to the tourist locations*” and “*Having children is a psychological and physical burden*” are claims that may be stated at the beginning of an argument followed by support.

Due to this characteristic the context plays a major role for identifying a claim. For identifying the claim, it is important to understand at least the content of a whole paragraph before deciding which statement is the claim of the argument. In persuasive essays a paragraph includes in most cases a single argument with one certain claim and reasons supporting that claim. In some cases, the claim appears as an initial assertion as well as a conclusion. In those cases both should be annotated as claims.

Usually a paragraph covers a certain aspect with respect to the topic. In those cases it is usually obvious which statement is the claim. However, in some essays a single paragraph may cover several aspects and several claims respectively. In these cases the paragraph can also include two or more distinct claims that should be marked by the annotator.

Claims can be indicated by so called claim indicators. These indicators can facilitate the identification of claims but do not guarantee the presence of claims since authors may use the indicators misleadingly. However, in some cases claim indicators can facilitate decisions. For example if a claim is stated as a conclusion at the end of a paragraph indicators like “*Hence*”, “*Therefore*” or “*In conclusion*” may signal the presence of a claim. The Appendix A of this guideline contains a list of indicators that can be used to facilitate decisions.

To separate claims from other statements, we annotate the claim annotation at the clause level. So the claim is annotated as a statement that includes all aspect relevant information. A simple test to verify if the claim is a complete statement is to prepend the clause “It is true that, <claim>”. If the resulting sentence is grammatically correct, the annotation is valid. The following examples illustrate the segmentation of claims (The claim is in bold face).

Example 1: “**This kind of music is awful** because it does not include any harmonies”.

Example 2: “Basically I think **human cloning is against the laws of nature.**”

Example 3: “Finally, because awareness raising programs will take a long time, until then for a faster solution, **the government, which has the power to enforce such programs, should start compulsory birth control programs while raising consciousness and conducting publicity campaigns.**”

Note: “... raising consciousness and conducting publicity campaigns” are aspects that should be included in the claim annotation

Example 4: “In my opinion, human cloning is very dangerous but **cloning animals and organs is useful for the improvement of quality of human life and for the treatment of lethal diseases.**”

Note: “... the improvement of quality of human life and for the treatment of lethal diseases” are aspects that should be included in the claim annotation.

(Note: the punctuation is not included in the annotation)

Besides the actual annotation of the claim, we also include a stance attribute for each claim that indicates if the claim is either for or against the stance of the author. The stance of the author is indicated by the major claim that was annotated in the previous step. If the stance of the author is for a certain topic or aspect, a claim that supports this stance is annotated as “for” whereas a claim that attacks the stance is annotated as “against”. If the author has a neutral stance the claim is annotated as for or against the general topic of the essay. The following examples illustrate the annotation of the stance property:

Example 1: “Second, **it is essential for individuals to save money in order to handle unexpected situations they might face in the future.**”
(Stance: for) (Author is for saving money; indicated by major claim)

Example 2: “They argue, that **listening to classical music supports the intellectual development of children.**”
(Stance: against) (Author is against listening classical music)

Example 3: “On the other hand, **human cloning causes ethical problems.**”
(Stance: against) (Author has a neutral stance)

For identifying claims, the following questions can be asked for every statement in a paragraph to facilitate the decision of the annotator:

- Is the statement supported by at least one other statement?
- Is there a reason given why the statement should be considered as true?
(Note: sometimes a claim is also stated without support, then it should be also annotated.)
- Is the statement an assertion with respect to a certain aspect?

3.3 Annotation of Premises

In this step we focus on the annotation of the second component of an argument: the premise. Premises are reasons that are provided by the author for supporting or attacking a certain claim. So it is a kind of justification that underpins or rebuts a claim. For example the statement “*Children bring happiness and meaning to your life*” is a supporting premise whereas “*It is a heavy psychological burden to have children*” is an attacking premise for the claim “*Having children is the ultimate bliss in our lives*”. In this case both should be annotated as premises, the distinction between supporting and attacking premises is done in the next step in which premises are linked to claims.

Since the context and the identified claims from the previous step are important for annotating premises, the annotator should search for each claim in a paragraph if there are reasons given that support or attack the claim. It is possible that a claim and a premise are included in a single sentence or that a premise is only a part of a sentence. So the annotation of premises is also conducted at the clause level. The rules for annotating the spans are the same as those for annotating claims.

For premises as just as for claims, there are indicators that can be used to facilitate the identification. For instance “because”, “due to” or “assuming that” are typical premise indicators. A more detailed list is provided in the Appendix B of these guidelines. The indicators provide only a vague support for the identification since many authors use cue phrases misleadingly. So it is important to understand at least the whole content of a certain paragraph for making the right decision. The examples in the following section illustrate the annotation of premises as well as claims.

For facilitating the identification of premises the annotator can ask the following questions for each claim and statement (a potential premise) in a certain paragraph:

- Is the statement a reason or justification (or an attack) for the considered claim?
- Is the statement supporting another premise?
- Does the statement contribute to the confirmation of the claim?

3.4 Overview of Annotation Elements

In the first step of the argument annotation we consider three different tags: (1) MajorClaim (2) Claim and (3) Premise. Each of those tags is used to annotate a certain text span. The claim contains an additional attribute called stance that indicates the polarity of the claim with respect to the author's stance (indicated by the major claim). The stance of a claim can be set to for or against.

<i>Annotation</i>	<i>Attributes</i>	<i>Values</i>
MajorClaim	–	–
Claim	stance	for, against
Premise	–	–

Table 1: Overview of annotation elements of the first annotation step

3.5 Example Annotations

For illustrating the annotations, we provide some example annotations in this section.¹ Those should be carefully studied before starting with the annotation task. In most of the examples the whole section or paragraph is provided since the context is crucial for argument annotation.

3.5.1 Examples of Major Claims

Example 1: *"Cloning is creating a genetic copy or replica of cells, tissues, embryos, and genes of an already existing organism. Thanks to advances in new technology, cloning of animals has succeeded, but a human has not been cloned so far because of the lack of technology and the prohibition by governments. I think that **a human cannot be cloned** because human cloning involves many risks."*

Major Claim: "a human cannot be cloned"

Author's stance: against (cloning)

Example 2: *"It is always said that competition can effectively promote the development of economy. In order to survive in the competition, companies continue to improve their products and service, and as a result, the whole society prospers. However, when we discuss the issue of competition or cooperation, what we are concerned about is not the whole society, but the development of an individual's whole life. From this point of view, I firmly believe that **we should attach more importance to cooperation** during primary education."*

Major Claim: "we should attach more importance to cooperation"

Author's stance: for (cooperation)

Example 3: *"In sum, I think human cloning may cause a lot of big and important problems for people, clones and the world. However, I think cloning of animals and organs is beneficial to people and science. So **"yes" to cloning of animals and organs, but "no" to human cloning.**"*

Major Claim: "'yes" to cloning of animals and organs, but "no" to human cloning"

Author's stance: for (cloning of animals); against (human cloning)

¹ The example essays are taken either from <http://www.buowl.boun.edu.tr> or <http://www.essayforum.com>

3.5.2 Examples of Claims and Premises

In the following examples **claims** are in bold face and premises are underlined.

Example 1: ***"This music is awful"** since it does not include any harmonies.*

Claim: "This music is awful"

Premise(s): "it does not include any harmonies"

Example 2: ***„Furthermore, it is a very heavy psychological and physical burden to have children.** A mother carries her baby in her womb for nine months and 10 days and then the baby torments her during and after the birth. There is no peace, no silence or no sleep at home. On the other hand, the father has to work hard and earn more money because the baby comes with his expenses.*

Claim: "it is a very heavy psychological and physical burden to have children"

Premise(s): 1. "A mother carries her baby in her womb for nine months and 10 days and then the baby torments her during and after the birth"
2. "There is no peace, no silence or no sleep at home."
3. "the father has to work hard and earn money"
4. "the baby comes with his expenses"

Note: The fourth sentence ("On the other hand, a father...") is separated in two premises, since the second part of the sentence is a support for the first part. If the sentence would be stated without context the first part of the sentence would be a claim and the second its premise.

Example 3: ***„Second, living and studying overseas is an irreplaceable experience when it comes to learn standing on your own feet.** One who is living overseas will of course struggle with loneliness, living away from family and friends but those difficulties will turn into valuable experiences in the following steps of life. Moreover, the one will learn living without depending on anyone else.*

Claim: "studying overseas is an irreplaceable experience when it comes to learn standing on your own feet"

Premise(s): 1. "One who is living overseas will of course struggle with loneliness, living away from family and friends"
2. "those difficulties will turn into valuable experiences in the following steps of life"

3. "the one will learn living without depending on anyone else"

Note: In this example the first premise attacks the claim. This premise is again attacked by the second premise, whereas the third premise directly supports the claim. It is important to notice that the second sentence contains two premises.

Example 4: *"Admittedly, **it is more convenient to learn about historical or art items online.** With Internet, people do not need to travel long distance to have a real look at a painting or a sculpture, which probably takes a lot of time and travel fee."*

Claim: "it is more convenient to learn about historical or art items online"

Premise(s): "With Internet, people do not need to travel long distance to have a real look at a painting or a sculpture, which probably takes a lot of time and travel fee"

Example 5: *"To begin with, **some popular people might feel uncomfortable to work when their privacy is gone.** This is because they do not have something that they can hold on to. To exemplify what I mean, if some negative issues of a famous actor would be revealed, he might not have the confidence to face his co-workers especially his supporters. So, his performance at work could be compromised."*

Claim: "some popular people might feel uncomfortable to work when their privacy is gone"

Premise(s): 1. "they do not have something that they can hold on to"
2. "if some negative issues of a famous actor would be revealed, he might not have the confidence to face his co-workers especially his supporters"
3. "his performance at work could be compromised"

4 Step2: Annotation of Argumentative Relations

In the second step of the annotation the identified argument components are linked either with *support* or *attack* relation. Those relations hold between pairs of argument components. In particular a support or attack relation can be assigned to a claim or premise supporting (or attacking) a major claim, or to a premise supporting (or attacking) either a claim or another premise.

4.1 Link Claims and Premises

First, we link the argument components in each paragraph. A link can either be included from a premise to another premise or from a premise to a (major-) claim. In both cases the statement of the relation's source either supports or attacks the statement of the relation's target. Or in other words, the direction of a relation between two argument components indicates which component supports or attacks the other component. For instance in the sentence "***One of the most important components of the computer is its keyboard*** *because it allows the user to communicate with the computer.*" the premise supports the claim. Thus, a relation from the premise to the claim is included. The example 3 in section 3.5.2 illustrates the case where a premise is connected to another premise. In this example a counter premise (a premise that attacks a certain claim) is attacked by another premise.

Argumentative relations considered in this step are support or attack relations. A *support relation* indicates that a statement (source of the relation) underpins another statement (target of the relation). A support relation holds between a target and a source statement if the source statement is a justification or a reason for the target statement. For facilitating the annotation and to make accurate decisions even in doubtful cases the annotator can formulate the following sentence to test if a support relation holds between two components "It is true that <target statement> because <source statement>." If the resulting sentence is meaningful a support relation should be included between the source and the target component.

Attack relations indicate that a statement (source of the relation) rebuts another statement (target of the relation). An attack relation holds between a source and a target statement if the source statement indicates that the target statement is not true. Analogue to the support relation, formulating a sentence including the target and the source statement can facilitate decision making. For attack relations the annotator can form the following sentence: "It is not true that <target statement> because <source statement>". If the sentence is meaningful, a relation between target and source statement should be created.

It should be noted that both patterns provide only a decision help for facilitating the annotation process. There will be cases in which those patterns cannot be directly applied to the formulations given in the text. In those cases it is helpful to reformulate the statements.

For further facilitating the annotation of the relations, the annotator can follow a simple process. This helps to not lose track during the annotation task:

1. In each paragraph start with a claim
2. If a premise obviously supports or attacks the claim, link it to the claim.
3. For all not connected premises in the paragraph, test if it could be connected to an already connected premise. if that is not possible reformulate the premise and connect it to a matching claim or premise in the same paragraph.

With the help of this process the annotator iteratively builds a tree starting with a certain claim in a paragraph. If there are several claims in a paragraph, this process is repeated for each claim. In this case the annotator has to decide in the third step to which claim a premise belongs. This can usually be done easily by considering the context. If two claims are identical (e.g. this is the case if an initial claim is reformulated as a conclusion at the end of a paragraph), both claims should have the same supporting or attacking premises. Finally, all premises should be connected to either a claim or another premise.

For deciding if a relation holds between a target and source statement the following questions can be asked to facilitate the decision:

- Is the target statement underpinned or rebutted by the source sentence?
- Is one of the following patterns meaningful?
 - Support relation: It is true that <target> because <source>
 - Attack relation: It is not true that <target> because <source>

4.2 Link Claims and Major Claim

Having linked all argument components in each paragraph, the claims of each paragraph are now linked to the major claim that is either annotated in the introduction or in the conclusion. For this step the same relations and the same rules as in the previous step are applied. The only difference is that the target of the relation is the major claim and the source is a claim in a certain paragraph. Finally most of the claims in the paragraphs are linked to the major claim with either a support or an attack relation. In some cases the author includes claims that are either off-topic (not directly related to the major claim) or represent some kind of recommendation with respect to the topic that is supported by the major claim (this is often the case in the conclusion). In those cases the claim cannot be linked to the major claim.

4.3 Overview of Annotation Elements

In the second step of the annotation process we consider two different relations: (1) support relations and (2) attack relations. Both types link either a premise to a premise, a premise to a claim, a premise to a major claim or a claim to a major

claim. The linking can be done easily by a drag n' drop interaction in the annotation tool.

Relation	Sources	Targets
supports	Premise	Premise
	Premise	Claim
	Premise	MajorClaim
	Claim	MajorClaim
attacks	Premise	Premise
	Premise	Claim
	Premise	MajorClaim
	Claim	MajorClaim

Table 2: Overview of argumentative relations in the second annotation step

4.4 Example of Relation Annotations

Example 1: ***“An advanced gun background check should become routine in all gun sales because it will prevent gun rampages.”***

supports: *“An advanced gun background check should become routine in all gun sales”* ← *“it will prevent gun rampages”*

Example 2: ***“Automated Essay Scoring can be used to reliably assess the writing skills of students because it is based on elaborated NLP technologies that could not be cheated.”***

supports: *“Automated Essay Scoring can be used to reliably assess the writing skills of students”* ← *“it is based on elaborated NLP technologies that could not be cheated”*

Example 3: „If human cloning became possible what would be the outcome of it? Basically I think **human cloning is against the laws of nature**. There is a well organized balance of nature and human cloning may damage this wonderful balance since the number of people would increase due to cloning.”

supports: 1. “human cloning is against the laws of nature”
 ↔ “there is a well organized balance of nature and human cloning may damage this wonderful balance”
2. “there is a well organized balance of nature and human cloning may damage this wonderful balance”
 ↔ “the number of people would increase due to cloning”

Note: The first relation holds between the claim and the premise whereas the second relation is between two premises.

Example 4: “First of all, people cannot predict their own future or know what will happen tomorrow. The world is full of disasters such as wars, pollution, famine, drought, starvation, natural disasters and diseases. So it is just a big mistake to have children.”

supports: 1. “it is just a big mistake to have children” ↔ “The world is full of disasters such as wars, pollution, famine, drought, starvation, natural disasters and diseases”
2. “it is just a big mistake to have children” ↔ “people cannot predict their own future or know what will happen tomorrow”

Example 5: “Second, **living and studying overseas is an irreplaceable experience when it comes to learn standing on your own feet**. One who is living overseas will of course struggle with loneliness, living away from family and friends but those difficulties will turn into valuable experiences in the following steps of life. Moreover, the one will learn living without depending on anyone else.”

supports: 1. “living and studying overseas is an irreplaceable experience when it comes to learn standing on your own feet” ↔ “the one will learn living without depending on anyone else”

attacks: 1. living and studying overseas is an irreplaceable experience when it comes to learn standing on your own feet” ↔ “One who is living overseas will of course

struggle with loneliness, living away from family and friends”

2. *“One who is living overseas will of course struggle with loneliness, living away from family and friends”*

← *“those difficulties will turn into valuable experiences in the following steps of life”*

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APPENDIX A: Claim Indicators

accordingly
as a result
consequently
conclude that
clearly
demonstrates that
entails
follows that
hence
however
implies
in fact
in my opinion
in short
in conclusion
indicates that
it follows that
it is highly probable that
it is my contention
it should be clear that
I believe
I mean
I think
must be that
on the contrary
points to the conclusions
proves that
shows that
so
suggests that
the most obvious explanation
the point I'm trying to make
therefore
thus
the truth of the matter
to sum up
we may deduce

APPENDIX B: Premise Indicators

after all
assuming that
as
as indicated by
as shown
besides
because
deduced
derived from
due to
firstly
follows from
for
for example
for instance
for one thing
for the reason that
furthermore
given that
in addition
in light of
in that
in view of
in view of the fact that
indicated by
is supported by
may be inferred
moreover
owing to
researchers found that
secondly
this can be seen from
since
since the evidence is
what's more
whereas