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# Dialogue with a Temperament

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*A Research into applying Border's variable to interactive dialogue.*

## Why this project?

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The interactive dialogue that is often at the heart of an interactive story has not changed much since it was first used. Its original use of giving the player a simple choice in how to proceed has become too simplistic and even in some cases redundant as there are other means through gameplay that might be cheaper in production. I want to help Interactive Narrative evolve to become more immersive and complex. Finding the cheapest means to make an interactive dialogue is in most cases no longer essential. Game graphics these days improve with leaps and bound as the calculating strength of computers increase. Audio in games has become higher in quality, as more memory becomes available. Cutscenes become more elaborate as the capturing technology advances. A lot of time and money is spend making games look and sound great. Cutscenes boost the narrative but do not necessarily help gameplay. One of the key words when it comes to a narrative driven game is immersion. Especially when the player is also the character, as in most RPGs (the player creates the character's look and often past history). Immersion is often found by having the character reflect the player. Immersion can be broken in different ways, and one of them is the response of the NPC to the player's dialogue or actions. Most NPCs are not programmed to be coherent while they interact with the player. If they are programmed with a disposition it is usually one variable that tracks the NPC's 'like' towards the player, nothing more. But often this 'like' is not evident in the conversation itself. As I was doing my research into interactive dialogue, I came across the research paper of Border. In this paper he describes how a more natural conversation can be programmed with the use of his mechanics. The question is if Border's Mechanics can be adapted to create a more coherent Interactive dialogue. I will attempt to implement his mechanics and make them part of my dialogue system (Narro). I will refer to the implemented mechanics as Border's Variables from here on.

## Narro basic setup

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The dialogue in Narro is divided into Categories. They have their own main theme. *e.g.* work. In a real conversation, it would be odd to jump from one subject to the other if there is no link between them. Narro's Categories makes use of that. Categories can, however, cross reference with other Categories. *e.g.* work and money. The money Category might have a similar reference, but that one will be deactivated once the cross-reference has been made. It would be odd to ask the same question twice if there is no real need for it. These Categories are internally divided into different Chunks. Every Chunk is a question, an answer and a response to the answer, if required. A Chunk should be set up as a standalone piece, but can be used in conjunction with other Chunks if needed. Chunks can also influence other Chunks, in their own Category or in another. For instance, with the cross reference, they can turn each other off or on. When the system enters a Category, it will first play out the introduction Chunk. It will set the theme of the Category and introduce it to the player. *e.g.* "and how has your wife been?". When required, a Category can have an outro as well. All these Categories and their Chunks are influenced by 3 sets of Border's variables, and booleans.

## From Border to Narro – a summary

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The dialogue system is set up as a game in which the player can manoeuvre through a conversation with the NPC. I set up a scenario that gives the player an incentive to play in a specific manner. The Player Character (PC from here on) has been accused of arson, and is being interrogated (The Arson Case) by the NPC, a police investigator. The behaviour of the player directly influences the NPC's decision, on whether or not the PC is guilty. The Narro system is structured to have the NPC ask a question followed by the PC's answer, after which the next line of the NPC plays. Which NPC line plays is dependent on the PC's previous response. To track these previous answers Narro uses variables as suggested by Border

## Emotional Variables

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In Borders paper, he briefly mentions the use of emotional stats that can influence the NPC. Because The Arson Case has no emotionally invested NPC, it will not be included in Narro for now. The main focus of Narro is coherency of the dialogue and therefore it does not require emotional variables at this point.

## Relationship Variables

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Border describes 5 relationship variables that drive a conversation. For these Variables he uses differently sized scales to track them. For convenience, I made every variable have a value scale between -10 and 10. Giving all of them the same scale, makes it easier for the Narro system to compare them.

## The relationship variables as described by Border are:

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### The Ball:

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This is a variable that tracks who is speaking at the moment. The ball gets tossed to the next speaker when it is her/his turn. Border's ball variable is useful in a conversation with more than 2 people. In The Arson Case, the conversation will keep switching between the NPC and the player, making it turn based. The ball gets thrown between the two and does not need to keep track of other potential speakers. In Narro the ball variable is reduced to prompting the Interface for the Player when the NPC is done talking.

### Close:

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"Closeness is the feeling people have of being in contact with each other. Two strangers passing on the street have a closeness of zero. Greetings increase closeness to a "talking" level (close between 1 and 5). More interactions may increase the level to "interested" (5-10), "intimate" (10- 20) and finally to "obsessive" (20+)." (Border, 2005)

In Narro, I use the closeness variable to measure how much the NPC can relate to the player. When the player talks about situations the NPC has also been through, or can imagine what it is like, the closeness raises. But the opposite is also true: if the NPC and the player have nothing in common or have different thoughts on a subject, the closeness decreases.

### Face:

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"Saying something stupid or inappropriate causes one to lose face. Saying wise, intelligent, incisive things causes one to gain face." (Border, 2005)

In Narro, face refers to saving face. Pretending not to be bothered by something or pretending to be strong, saves face, acting confused or emotional decreases the face value.

## Like/Irritation:

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“Being agreeable and telling jokes can get characters to like each other. Liking is a one-way feeling (A may like B without B liking A), Similarly, being disagreeable can irritate others.”(Border, 2005)

This variable speaks for itself: 0 is natural, positive is like and negative is dislike. (Even if variables speak for themselves, I'd still add an explanation for them.)

## Trust/Distrust:

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“Characters may decide to trust or distrust each other in the course of a conversation. Trust may be required for some chunks. Finding contradictions and untruths in someone's statements causes a loss of trust, while discovering mutual acquaintances usually raise it.”(Border, 2005)

Also a self explanatory variable. Because of The Arson Case's setting, it is a very important variable: the more the NPC trusts the player, the better the outcome of the conversation will be.

The decay of the variables over time is relevant only if the relationship is maintained over a long period of time: months to years. Because The Arson Case is only one conversation in a short timeframe (about an hour), the decaying factor is not implemented. For other game types the decay factor may be useful, and can easily be added and tweaked when it becomes important.

## Payoff Functions

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In Borders document he talks about the Payoff, The individual goal of a Character that they strive for during a conversation. e.g. looking for a good intern candidate or just someone to talk to. Because of The Arson Case scenario, the payoff of the conversation would be the judgment of the NPC over the PC. The NPC's goal is to determine the innocence or guilt of the PC. The PC's goal is determined by the player itself. The Arson Case will end with the Payoff of the NPC and with it the PC's payoff as well.

## The next Chunk

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In Narro, the conversation is split in Categories and they consist out of different Chunks. Border uses the name chunk for a set of actions or dialogue lines. In Narro, a Chunk is a single action or dialogue set (quest, answer and a possible response) that can exist in and of itself. A chunk is the smallest piece of a category that can be interchanged with others without losing coherency. The interchangeable chunks are what allow Narro to be adaptable to different situations. It does not need to play out a set line, but can use the Border variables to pick the next appropriate chunk to play, meaning that the next question the NPC asks is weighed against already given answers. What the next Chunk in the conversation is going to be depends on the value of the Border's variables thus far and in some cases, if the requirements are met. Every Category and Chunk is given a required variable value. The one that is the closest to the current value is the one that will be played out. The problem with having values that have to be spot on is that the conversation might stall because the system has no Category or Chunk that matches the current value, To prevent this I chose to go for a system that looks for the closest value (within a range). when a Category has no more available Chunks (either they have already been played out or the values don't match), the system will move out of that Category and move on to the next one that has the closest value and who's requirements are meet. If there are no more categories to play out then Narro will move to the Payoff/Outro

## Communicating Facts

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Border describes in his paper how to turn conversational information into Boolean values (Booleans are variables that are either True or False) that can unlock future Chunks. Narro has a similar facts tracker: Some Chunks can unlock or lock other Chunk for later use and player's answers can do the same. Previous answers of the player can also influence the values of answers later on, especially if they don't match. If the answers of two different questions on the same subject don't match up, the NPC has basically caught the PC on a lie and the trust and like value will go down. If the player sticks well to his story, the trust and like value of the NPC will go up. e.g. if the character talks lovingly about his son at one point and calls him a brat the next, that can be considered an inconsistency and an indication that the character is untruthful. If the character talks lovingly about his son throughout the whole conversation, there would be no reason not to trust him.

## Add-ons to Narro

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The differences between Border's system and Narro:

Narro uses the Borders variable to micromanage every line spoken. It is purely an implementation for the use in interactive dialogue and actions in a game. As where Border stays very general in the use of the mechanics.

## First impression

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When we meet someone for the first time we already start to form an opinion, This is assembled by our own experience with other people, and the general appearance of the individual in question. During a conversation, we will gradually change or confirm these opinions. In The Arson Case, the NPC already starts the conversation with a first impression of the PC. This option is generated randomly, but can be preset if required. The random impression gives The Arson Case more diversity every time it is played.

## Different versions of the Border variables

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Narro uses the Border variable in 3 different variations.

**Long Variable:** Is set at a random value at the beginning of the game (first impression) and can change gradually over the course of the gameplay. At the end of the game, the long variable is used to calculate the ending. It reflects the overall impression you have of someone. It does not change much over night. (Unless the conversation partner does something radical). It will change gradually over a period of weeks to years.

**Short Variable:** Tracks the progress through a Category as it progresses. It is a short term impression that will help pick the next Chunk. It can correlate to the state of mind that will drive the course of a conversation. *E.g.* when you are talking about a private subject you will continue talking about it until the subject is depleted or a change is forced, by for example a lack of trust. After a category is finished the Short variable will be used to influence the long variable. As the conversation moves on we change our opinion of a person ever so slightly as we get to know them better.

**Chunk Variable:** Holds the value of the current question that is being played out. When this variable is radically different than the short variable, then the system knows to react as if it is confused. *E.g.* when we have been in a conversation with a person, as time progresses it is easier to predict the type of answers the other person will give. When an answer is not along those lines we get confused because our line of expectation is broken. Narro will tell the NPC to act surprised before moving on.

## Good cop back cop

To add even more diversity to Narro, the NPC can ask the same question but in a different way. The system does not need to be expanded by much. The possible answers for the player can remain the same. In the case of Narro the NPC can ask the question in two different ways: neutral or demeaning. e.g how has your son been doing/ and what has that brat of your been up to. It is basically the same question, but because it is asked in a different way, they better convey the emotional status of the NPC. The two different means of asking a question has their own different requirement of the Border variables to activate but the outcome is not influenced by them. Narro does not need to be limited to just two diversities; more can be added if that is required.

## Dialogue wheel setup

A way of writing dialogue is to first look at the bigger picture and then fill in the details after the most imported parts have been blocked out. To make the scriptwriting a bit more manageable, I set up the conversation wheel to reflect possible reactions to questions. However not all of them need to be filled in. This wheel is tailored to fit the scenario that occurs in The Arson Case. When the scenario is set in a different situation than this, the wheel should reflect that. e.g. add flirt



when the scenario is set in a bar and the PC is trying to get lucky. The main wheel can be divided into 3 sections: assertive, passive and aggressive.

There are other versions of this, think of the RPGs made by Bioware. They divide their sections into Good, Neutral or Evil. These sections are used to drive other mechanics in future conversation. The dialogue wheel can be setup any way a writer sees fit. In this case it seemed to make more sense to use the assertive, passive and aggressive setup, because a lot of human interactions can be divided into at least one of these sections. e.g. calling the NPC names = Aggressive, giving the NPC a pad on the back = Assertive, remain silent = Passive. They can give a handhold as to the different possibilities that can be available. Players might want to undertake a different action then the one that is considerate obvious. Making at least one option available in every section can accommodate for most of the preferred choices of any player.

Within these sections the wheel can be divided up further with possibilities that reflect the situation. e.g. things like intimidation, charm, blackmail, lie, ect. This wheel is nothing more then an aid for dialogue writers. It can help with writing possible answers in different forms. It does not have to dictate where all the possible answers need to be located in the final product. It depends on the goal and the target audience: some players prefer to have similar answers in the same place every time, though that might encourage player not to read all the possible answers before making a chose.

## Making the NPC

It would be desirable for a player to have NPC's that each respond differently to different situations. As no two people are alike so should the NPCs not just be a copy . When writing for the NPC, one needs to keep in mind that it is a character of its own. What one might find funny another might find offensive. These things are defined by Border's variables that are given to the different possible answers. Before

setting these variables it is wise to make a clear representation of the NPC's character. What does it like? What has it been through in the past? What does it want from the PC or other NPCs? What is its standing in the game world's society? Answering these questions in advance will help with setting the variables in the system. In comparison, chatbots don't go as far as things like a personal goal or history, they live in the moment and they need the player to drive them forward. They will hardly present emotions or a disposition to the player if they are not programmed to do so. But then again that is often not their purpose.

## Pros and Cons

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Border's mechanics are meant to make a conversation more coherent, and that in itself can be considered a big benefit when it comes to immersion. Having an NPC that changes to an unrelated subject, tells personal information to the player it has just met or is kind to the player after the player had just burned the NPC's house down, would be considered odd at best. Avoiding these kinds of situations would contribute to a more coherent NPC. Games that have roleplay or narrative at its core would become livelier, interacting with an NPC would have a flow to it and the mechanics behind the interaction would become more invisible to the player. In real life, one cannot accurately predict what the answer of the conversation partner will be, or what thought process drives that partner to say or do something. Because most interactive dialogue obeys comprehensible rules, a player can easily predict what the outcome or direction of an action will be.

In this fast-paced world, the negative thing about Narro is that it takes time and experience to set up. To be able to test the system, it needs to be fully built first. A tree system would not require the entire system to be built first, but has a starting point and can be expanded from there. With Narro, the extra time is mostly spent in setting up the variables for all the questions and answers. This time can be reduced with the use of a database once the system is fully functional. The content is, of course, dependent on how elaborate the dialogue is (how many different Categories and Chunks are there and how much do they influence one another?), but because of the Chunk base setup of Narro, the unseen assets can be less than that of a tree branching dialogue for instance. A tree branching dialogue will shut down a branch when a player picks another one. Any content from that branch will not be presented to the player and will remain unseen.

Narro still has a small form of branching, as the system moves from Categories into Chunks. The point of Narro is that it still has all its branching open and the system is not fixed to play out a specific branch only. It is free to jump to other Chunks and Categories. Because of the ability to jump, it minimizes the amount of unplayed Chunks. The only disadvantage comes with the writing of the dialogue itself: Writing chronologically is not practical. The order in which chunks are played out is not always the same. All the chunks need to be interchangeable, meaning that the dialogue can't be an open question that requires information from another Category.

Because of Narro's modular setup Categories and Chunks can easily be added or removed without it having any impact on other Categories or Chunks. There are also aspects of the system that can be randomised. Things like the first impression can be randomly generated instead of preset. Random events can also be added. These are events that occur at random or when a specified number of Categories or Chunks has been completed. These events can activate related Categories or Chunks, or change the NPC's disposition by altering its Border's Variables. Random events don't necessarily need to be triggered and their chance of being triggered can be customised. The possibility to randomise Narro increases its replay ability. It would be hard to get the same conversation twice, if it is properly implemented.

## Possible expansions

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### Implementing procedural animation

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Because the NPC's disposition is constantly tracked, it can be used to drive the NPC's animation. Things like body language and facial expressions can be tuned to use Narro's values to give a visual representation of the NPC's mood and disposition.

### Nepotism

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It is also possible to have NPC's give their opinion of the PC to other NPC's. This way it can be possible to setup a nepotistic system. The NPC is no longer an island with its own information on the PC but it can share it with other NPC who's disposition towards the PC will then change also. Border's variable can be used to define how much the NPC's disposition for each other correlates. *e.g.* if two NPC's don't like one another, they might not take the others word for it or even befriend the PC because the other NPC hates the PC.

### The NPC's actions

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Besides the interaction through dialogue, the variable can also be used to dictate the type of interactions possible with the NPC or the actions NPC might undertake involving the player. *e.g.* the NPC holds the door open for you.

## References

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- "Dialog as a Game" by Border 2006
- "Narro Dialogue system" by Bente Lee Gubbels 2013
- "Bioware" Games studio under Electronic Arts