

Notes on SYNTAL

Chapter 4: Artificial Stops:

tv, **dv** and Variants (V.00.2) For OSX

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In this chapter we take up what I call artificial consonants. I call them “artificial” because, although they resemble real consonants, not all of them can be produced in the human vocal tract.

You have been using the **vw** and **vv** macros—or, the preferred term, *event types*—up to now. If you have experimented with having different color parameters in a single one of those statements, then you know that you can get a kind of quick glide from the first color to the second color. The glides may not sound much like consonants, perhaps, but you might reflect on the sounds at the beginning of the words “you” and “way”. In “you”, the first color is II-like; in “way” it is UU-like. Such consonants are called “liquids”, and you can make them pretty well with the **vw** and **vv** macros or event types. And perhaps you can imagine artificial liquids that are made with glides from relatively Open colors, such as **AE** or **AW** to some following color. These don’t occur in English, but it is possible—sort of—to pronounce them. Try it.

The principle is the same in the more difficult cases of artificial stop consonants or “plosives”.¹ The artificial stops are specified by event types that have the same parameters, in the same order, as in **vw** or **vv**. In these events the first of the two color parameters pertain to the initial explosion and the beginning of the transition immediately afterward; the second color parameter pertains to the continuation of the sound after the consonant-like part at the beginning. If the first color is one of the non-Open colors, then the result is something like a real stop. But if the first color is even a little bit Open, then we get something artificial: the mouth cannot be closed to produce the stop and be Open at the same time.

To introduce the artificial stops, I thought I would quote from the actual definitions in the file `/usr/local/bin/qmSYNTAL03.dfs`. For stops there are two main event types, **tv** and **dv**, with variants of each.

¹To illustrate from speech, a range of natural, non-artificial stop consonants begin each of the following words: “bay”, “pay”, “gad”, “cad”, “dead”, and “Ted”.

The **tv** variants

The **tv** type produces aspirated or unvoiced artificial consonants that are inspired by the “unvoiced” stops, like those in “pay”, “cad”, and “Ted”.

Here is the definition of **tv** and some variants, **tvd** (in which the detailed durations are specified), **tv_** (with a rest following), and **tvd_** (detailed durations and a rest following):

(Note: In some cases in these examples, lines have been broken to make the definitions fit within the page. For the actual definitions, see the file “qmSYNTAL03.dfs”).

```
/*
 * Un-Voiced (aspirated) plosives (derived from liquids)
 *   The parameters are: duration(DR), color1(C1), color2(C2)
 *   accent(AC), loudness(LD), end_loudness(EL),
 *   pitch(F0), aspir_lev(AS), and end_asp_lev(ES).
 *   A number of other parameters are mostly durations.
 * Here's the ‘function’ definition line
 * tv(DR,C1,C2,AC,LD,EL,F0,AS,ES,
 *   RmpToSt,STdr,BrstLev,BrstDr,LocusDr,RmpToVow,LimDr);
 */
#define SPR1 .040
#define SPST .050
#define SPBK .002 /* Default burst onset Duration */
#define SPBD .006 /* Default burst Duration (onset + decay) */
#define SPBL 6.0 /* Default decrement of the burst level (dB) */
#define SPL0 .030 /* Default "locus" dr (secs.) */
#define SPR2 .100
#define SPLM .25
#define tv(DR,C1,C2,AC,LD,EL,F0,AS,ES) \
    tv(DR,C1,C2,AC,LD,EL,F0,AS,ES,SPR1,SPST, \
    SPBK,SPBD,SPBL,SPL0,SPR2,SPLM);
#define tvd(DR,C1,C2,AC,LD,EL,F0,AS,ES,R1, \
    Clo,BKr,BDr,BLv,Loc,R2,Lim) \
    tv(DR,C1,C2,AC,LD,EL,F0,AS,ES,R1,Clo,BKr, \
    BDr,BLv,Loc,R2,Lim);
#define tv_(DR,C1,C2,AC,LD,EL,F0,AS,ES,RPF) \
    tv((DR-RPF),C1,C2,AC,LD,EL,F0,AS,ES, \
    SPR1,SPST,SPBK,SPBD,SPBL,SPL0,SPR2,SPLM);\
    VOWn( RPF, C2, Z,F0, Z,EXP);
#define tvd_( DR,C1,C2,AC,LD,EL,F0,AS,ES, \
    RPF,R1,Clo,BKr,BDr,BLv,Loc,R2,Lim) \
    tv((DR-RPF),C1,C2,AC,LD,EL,F0,AS,ES,
```

```

    R1,Clo,BKr,BDr,BLv,Loc,R2,Lim); \
VOWn(   RPF,   C2,           Z,F0, Z,EXP);

```

To use **tv** in a source file, you might type something like:

```
tv 3.20,UU,AA, F, PP, FF,FS2, P,Nte)
```

This will sound a bit like “pa”.

The dv variants

The **dv** Event types produce unaspirated or voiced artificial consonants that imitate those in “bay”, “gad”, and “dead”. Here are the definitions of **dv**, **dvd**, **dv_**, and **dvd_**:

```

/*
 *      Voiced, colored plosives in inter-vocalic position *
 *      dv(DR,C1,C2,AC,LD,EL,F0,AS,ES,                                     *
 *          RmpToSt,STdr,BrstAttack,BrstLev,BrstDr,LocusDr, *
 *          RmpToVow,LimDr);                                           *
 *
 *
 *      On 96_10_20:      VPR2 from .050 to .070                      *
 *                      VPLM from .20 to .25                          *
 */
#define VPR1      .040
#define VPST      .050
#define VPBK      .002      /* Default burst attack dur. (secs.) */
#define VPBL      9.0       /* Default decrement of the burst level (dB) */
#define VPBD      .006      /* Default burst duration */
#define VPL0      .030      /* Default "locus" dr (secs.) */
#define VPR2      .070
#define VPLM      .25
#define dv(DR,C1,C2,AC,LD,EL,F0,AS,ES) \
    dv(DR,C1,C2,AC,LD,EL,F0,AS,ES,VPR1,VPST,VPBK,VPBD,
    VPBL,VPL0,VPR2,VPLM);
/*      Voiced, intervoc., clred plosive, complete ramp control */
#define dvd(DR,C1,C2,AC,LD,EL,F0,AS,ES,R1,STdr,
    BKdr,BDr,BLv,LocDr,R2,LimDr) \
    dv(DR,C1,C2,AC,LD,EL,F0,AS,ES,R1,STdr,
    BKdr,BDr,BLv,LocDr,R2,LimDr);
/*      Voiced, intervoc., clred plosive, end of a sequence      */
#define dv_(DR,C1,C2,AC,LD,EL,F0,AS,ES,RPF) \
    dv((DR-RPF),C1,C2,AC,LD,EL,F0,AS,ES,VPR1,VPST,VPBK,
    VPBD,VPBL,VPL0,VPR2,VPLM); \
    VOWn(   RPF,   C2,           Z,F0, Z,EXP);
/*      Voiced, intervoc., clred plosive, end of a sequence      */

```

```
#define dvd_( DR,C1,C2,AC,LD,EL,F0,AS,ES,RPF,R1,STdr,
BKdr,BDr,BLv,LocDr,R2,LimDr) \
    dV((DR-RPF),C1,C2,AC,LD,EL,F0,AS,ES, R1,STdr,BKdr,
BDr,BLv,LocDr,R2,LimDr); \
    VOWn( RPF, C2, Z,F0, Z,EXP);
```

To use the **tv** and **dvd** variants you will probably want to see how the C-language function **dV** is defined in the file **qfSYNTAL03.c**. But if you don't want to get that far into the details, you can experiment by changing the values of the other duration parameters a little. The default values are shown in the definition: the parameter **R1** is by default the value **VPR1**, which is 0.40 seconds. But without more information you can use the garden-variety, vanilla versions, **tv**, **tv_**, **dv**, and **dv_**, with different colors to see how they sound.

For instance, in a SYNTAL source file you could type:

```
tv( 1.5,II,00, FF, F,Nte,FN3,PPP, Z)
```

This will give you something like the word “toe”. But if you reversed the colors, you'd get something that you can't pronounce. You may want to try these two out and then make voiced versions using the **dv** event type.